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NEWSPAPER

User Wins $2.3 Million From NCR

By Bill Laberis
CW Staff

SAN FRANCISCO — NCR Corp. was rocked last week by a $2.3 million verdict returned by a federal jury that found the company sold to a user a minicomputer system it knew would not work as promised and then tried to cover its tracks by willfully defrauding the user further.

The large settlement includes more than $2 million in punitive damages awarded to The Glovatorium, a wholesale suede and leather cleaner located in Oakland, Calif., as well as more than $200,000 for fraudulent misrepresentation, $50,000 for breach of contract and $7,000 for "bad faith."

Should the award withstand an NCR motion for a retrial or NCR appeals, it could be the largest-ever fraud verdict returned against a computer manufacturer.

Charges Against NCR

The suit, filed 18 months ago, charged that an NCR System 8200 minicomputer and Spirit software package sold to The Glovatorium for $60,000 in 1975 never functioned at better than 20% of its warranted capability.

NCR spokesman John McCoy said that because of impending appeals and a motion for a new trial, the company would offer no comment on the verdict. The company found some bugs in the 8200 system when it was first introduced in late 1974, he added, but said finding such bugs was not unusual in a new system.

It was determined during the 10-day trial that NCR knew the system had inherent defects and, even after a pilot run of the system had failed, NCR continued to aggressively market it and did not tell its customers about the problems, according to Steven Depper, vice-president of The Glovatorium and the company's key witness.

"NCR knew the machine and software had significant problems when they sold it to us," Depper said. "We proved this in court."

In addition, both Depper and his attorney, Richard Perez, said NCR service engineers intentionally chiseled off and switched the serial numbers on a defective disk drive it sold The Glovatorium in an attempt to pawn off an older model in place of the newer, defective one.

"They took out the defective disk drive and replaced it with a loaner,

(Continued on Page 8)

More Than 100 Users Risk Losing Millions If OPM Goes Under

By Marcia Blumenthal
And Tim Scannell
CW Staff

NEW YORK — More than 50 banks and financial institutions and well over 100 users stand to lose a quarter of a billion dollars — or more — in what could be the largest shakeup in the history of computer leasing.

At the center of intense legal attention is OPM Leasing Services, Inc., a multimillion-dollar leasing firm that has filed for Chapter 11 protection. The firm used allegedly phony and cut-rate leases to under-cut competitors iin the computer leasing market.

Listed in court documents as customers of OPM are some of the biggest names in American business, including AT&T, American Express Co. and Occidental Petroleum. Financing for OPM deals was arranged through such institutions as Manufacturers Hanover Trust and Metropolitan Life Insurance Co.

Two Suits Filed

At least two users have filed suit against OPM. Both Western Electric Co. and Evans Products Co. of Portland, Ore., filed suits against the besieged firm within days after OPM petitioned the courts March 11 for a Chapter 11 bankruptcy [CW, March 23]. Both companies are trying to recoup losses incurred through leasing arrangements with OPM, which reportedly included a number of early-out "crawl-away" clauses that never worked out.

In addition, scores of other customers affected by OPM's recent financial collapse have not yet filed suit.

Some of those contacted by *Computerworld* reported no foreseeable losses; others anticipate losses "in the seven figures," according to one official whose retail company leased two IBM 370/158 machines and a variety of peripherals from OPM.

"What made the lease attractive was that payment wasn't supposed to be conditioned on OPM's ability to remarket the equipment," the official, who declined to be identified, said "Therefore, the lease conditions

(Continued on Page 4)

U.S. Edge in Jeopardy, NCR Chairman Warns

By Brad Schultz
CW Staff

LAS VEGAS — The U.S. may lose its lead over other nations in computing and communications, NCR Corp. Chairman William S. Anderson warned the Interface '81 conference here last week.

The reasons? Lack of adequate design standards, systems incompatibility and incoherent regulatory policies, he said in his keynote address.

Users are "bewildered" by the range of data communications solutions that different vendors promote, the NCR chairman asserted. "The shopping list," he remarked, "is almost endless."

Moreover, the regulatory climate has become "murkier" in recent months, Anderson charged. While the federal government vacillates on regulation of AT&T and whether to

Additional coverage of Interface '81 continues on Pages 6, 7 and 8.

endorse particular standards, Europe is resolved to boost its productivity, he pointed out.

European governments have done more than the U.S. government to mandate controls over transborder data flows, the vendor chief added. Japan and some European nations will compete fiercely with the U.S. in

(Continued on Page 8)

Product Spotlight

Interest in CAD/CAM Rising As Technological Seesaw Tilts

By Tim Scannell
CW Staff

For years, computer-aided design and manufacturing (CAD/CAM) has been a veiled and possibly elitist facet of the data processing industry.

With an acronym that sounds more like a new candy bar than a sophisticated technology, CAD/CAM has always been a familiar science to printed circuit board and integrated circuit designers, but has usually taken a back seat to more mainstream, business-oriented computer developments.

In short, most traditional DP managers understood the "what" of CAD/CAM, but couldn't care less about the why, where or how.

However, the technological seesaw is tilting. Rising personnel costs, shorter product lives and the push to keep pace on the development treadmill have all contributed to a rising interest in CAD/CAM.

Added to this is the fact that a lot of necessary design applications — previously painstakingly carried out by a highly skilled craftsman — are now

(Continued on Page 18)

All Systems Go

In preparation for Space Shuttle launch on Friday, IBM test engineer checks main instrument panel displays and avionics controls in the Shuttle Orbiter cockpit simulator at Johnson Space Center. Story on Page 10.

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Datapoint Unveils 'Hybrid' PBX

By Bill Laberis
And Tim Scannell
CW Staff

NEW YORK — Datapoint Corp. last week announced an all-digital private branch exchange (PBX) system which is reportedly the first of its kind to integrate data, voice or any other type of digitized information at transmission speeds up to 56K bit/sec.

Billed as a third-generation "hybrid" PBX, the Information Switching Exchange (ISX) provides modular, incremental growth from 100 to 20,000 voice and data ports and is said to be priced comparably with existing voice-only PBX systems.

The company also announced a Key Switching Exchange (KSX), which it dubbed a "sophisticated key telephone system" designed to meet the needs of smaller PBX users.

Unveiled at a multimedia show here that was broadcast to 22 different locations nationally, the ISX encompasses a switching/process control subsystem which itself includes a Central Switching Unit (CSU) and Remote Switching Units (RSU) as well as the Data Management System (DMS) plus the telephones and terminals which provide user input to ISX.

The system was designed for full compatibility with the company's Attached Resource Computer (ARC) coaxial cable network, permitting users to utilize both coaxial cable and regular telephone wiring to transmit voice and data not only to local areas but to branch sites as well, the vendor claimed.

A typical ISX configuration with 888 ports is priced at about $900,000, including switching equipment, station instruments cabling charges and installation charges. The DMS includes an ARC 6600 processor, 20Mbyte disk drive, printer and 425 phones.

The KSX, aimed at smaller users, can support up to 128 station users and 32 telephone central office lines, the company said, and includes its own controller and digital handsets. The KSX is also able to communicate with ISX systems via most communications protocols, such as SNA, although the X.25 protocol "requires some special attention," a company official said.

A typical KSX configuration is priced at about $38,000 and includes 40 stations.

Vendors' Suit Over I/O Standards Stymied by Federal Appeals Court

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Four computer mainframers seeking to overturn federal I/O interface standards have been dealt a setback by a federal appeals court which upheld an earlier ruling that the firms do not have standing to sue the government over the standards.

The March 25 ruling by the U.S. Court of Appeals for the District of Columbia affirmed a January 1980 decision by the U.S. District Court here that vendors cannot invoke federal procurement laws to influence how the government buys DP equipment.

The four companies, Burroughs Corp., Control Data Corp., Honeywell Information Systems, Inc. and Sperry Univac, initiated the suit against the Secretary of Commerce in late 1979, charging the government "capriciously" promulgated four I/O interface standards.

At press time, none of the companies had decided whether to appeal the March 25 ruling, according to attorneys representing the firms.

The four standards, which went into effect for all large federal systems purchases June 23, 1980, are derived from IBM 360 and 370 architecture. The four firms said they would be hurt economically because they would need several years and millions of dollars to bring their equipment into conformance with the standards.

In the meantime, the companies said, they would be precluded from bidding for government contracts, which would result in lost revenues and less competition for federal contracts despite laws calling for greater competition for federal DP purchases.

The appeals court decision, written by Circuit Judge Edward A. Tamm, conceded the firms may indeed suffer "substantial economic injury" because of the standards. "A closer look at these cases, however, reveals the fragility of the foundation" of the firms' arguments for legal standing to bring the suits, Tamm wrote.

The companies have 14 days from the decision date to ask for a rehearing by a full panel of the appeals court. The initial hearing was before a three-judge panel. If the firms elect to appeal the decision to the U.S. Supreme Court they must file within 90 days from last month's decision.

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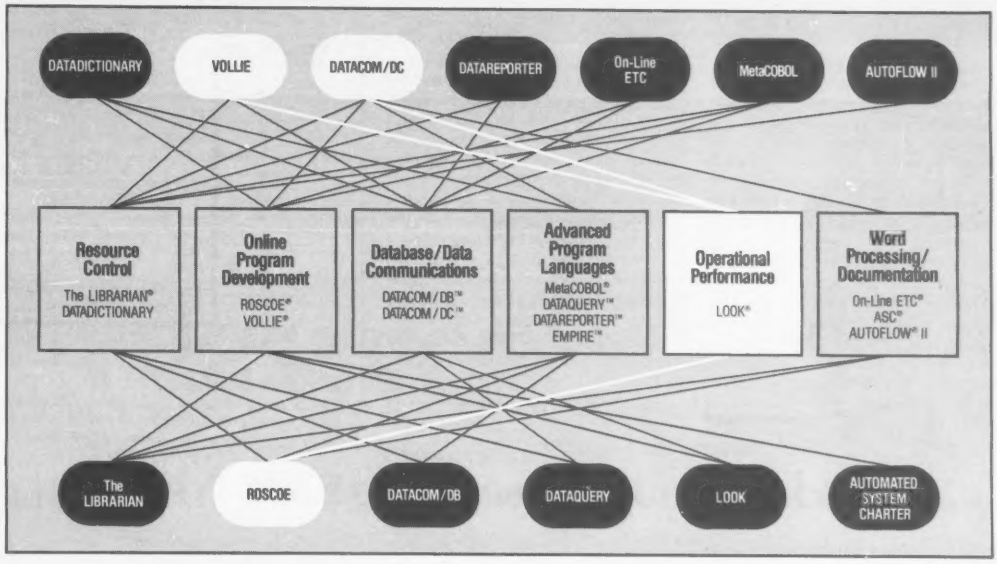

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Users Can Avoid Losses, Third-Party Lessors Note

By Marcia Blumenthal
CW Staff

The recent financial collapse of high-flying OPM Leasing Services, Inc., while sensational, should not deter users from negotiating third-party computer leases.

Although leasing contracts are highly individualized, complicated documents, users can take steps to protect themselves from possible financial losses by observing some basic business practices, according to executives at several prominent leasing companies.

Foremost, a computer lease is a *financial document*, and users should not sign an agreement unless they understand every clause — both the benefits and the risks — contained in the contract.

When OPM wrote its contracts in the mid-1970s, DP managers often did not understand the financial fine points of the contract, noted Edward Cherney, president of CMI Corp.

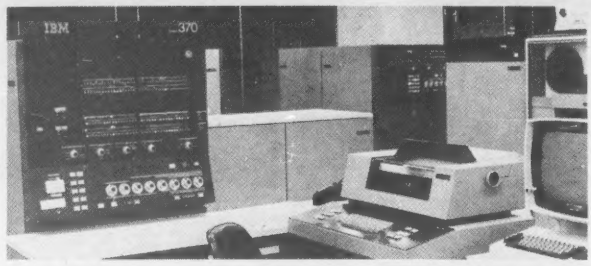
One of the benefits that should arise out of the OPM fiasco is that financial and legal departments of the user's organization will become more entwined with the lease contract. Moreover, banks will be examining the leasing contract much more fully, he added.

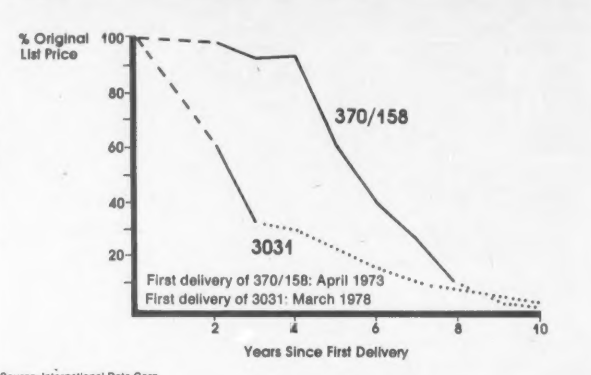
Furthermore, know who you are doing business with, advised Kenneth N. Pontikes, president of Comdisco, Inc. Users should not hesitate to ask for the leasing company's financial statement or references of other users. Although most leasing companies are privately held, they will provide financial statements.

By contrast, OPM reportedly was very close-lipped about its financial condition. In many cases users did not recognize this as a danger signal because they were too mesmerized by OPM's bottom-line deals.

A lease transaction is a "shared gamble" between the lessor and the user. In this respect, users should feel comfortable that the equipment will be worth what the lessor is guaranteeing. In some situations, OPM bet the IBM 370 equipment it was leasing would be worth 50% of its original value when the lessee walked away from the deal.

Today, sadly, those residual values are closer to 5% to 10% of the original value of the equipment.





In some situations, OPM bet the IBM 370 equipment would be worth 50% of its original value when the leasee walked away from the deal.

Leaseholders Could Lose Up to $250 Million

By Marcia Blumenthal
CW Staff

Although suits have been filed charging OPM Leasing Services, Inc. with writing fraudulent leases for Rockwell International Corp., many users with legitimate leases stand to lose perhaps up to a quarter of a billion dollars because they were blinded by the bottom line of the deals presented by OPM [CW, March 23]. "Old greed and avarice were at work," noted one executive at a prominent leasing company.

How did so many users wind up on the short end of the stick? DP managers responsible for acquiring equipment at a company were usually not responsible for the financial implications of that lease deal, maintained Jerry Minsky, president of Alanthus Corp.

Because they were not experienced in financial matters, they did not pay a lot of attention to the financial side of the lease. Compounding this situation was the high turnover rate among DP people, who often were not around when it was time to account for their actions.

Users finding themselves in this predicament probably signed an "indemnity lease," noted Ken Pontikes, president of Comdisco, Inc. Under this arrangement, a lessee agrees to sign a long-term lease, but is promised an early out by the lessor. The longer the term of the lease, the lower the monthly payments made by the user.

Moreover, some users may have signed leases that bundled the maintenance of the equipment in with the amount owed on the equipment, one lessor claimed. In this situation, the lessee would pay a financial institution or OPM the monthly amount for the equipment and the maintenance and have to collect the maintenanace portion of that payment from OPM.

However, if OPM has no funds the lessee cannot collect the maintenance portion of the lease. As far as the institution that financed the lease is concerned, the monthly lease payment is for the total amount because that is what was loaned the lessor.

Although Pontikes and other lessors noted indemnity leases are sometimes written in the industry, they agreed OPM took risks on these leases much higher than acceptable to other lessors. OPM took four or five times the amount of risk other vendors would have accepted, Minsky claimed. If Alanthus said the residual value of the equipment would be 10% at the end of the lease period, OPM would say the value would be 50%, Minsky explained.

By taking such risks, OPM was able to offer users monthly payments that were substantially lower than deals offered by other lessors. OPM started writing IBM leases about 1974 and in its heyday continually won business away from more conservative lessors.

Today virtually all leases written by lessors, including OPM, are full-payout, tax-leveraged leases, usually for a two- to four-year period.

Side Agreements

Lessees who signed indemnity clauses, in many cases as side agreements to the main lease, often believed they had a three- or four-year lease instead of a six- or seven-year

(Continued on Page 5)

OPM Shakeup Impacts Big Names

(Continued from Page 1)

seemed more of a certainty than they actually were."

Customers wrapped in OPM's monetary tangle include Rockwell International Corp.; McDonnell Douglas Automation Co.(McAuto); the Hartford Insurance Group; and the Fireman's Fund Insurance Co., a wholly owned subsidiary of the American Express Co.

Basically, it seems that any customer that entered into a more-than-three-year lease with OPM or had an early-out clause added to its lease stands to lose some money on the soured computer lease deal.

For instance, Evans Products, Inc. a $1.5 billion conglomerate that leased an IBM 370/145 and 155 through OPM with a "crawl-away" side agreement, stands to lose about $170,000 on the 145. To date, both CPUs are not in use and the company does have a prospect of re-leasing the 155 machine, according to an unnamed Evans spokesman.

Another company attracted by OPM's bargain basement rates and early dropout asides was Corning Glass Works of Painted Post, N.Y. Although an official at the firm would not elaborate on what kind of equipment was leased through OPM, he explained that the company did have early-out clauses written into its leases.

In another instance, officials at a pharmaceutical company realized that OPM had the potential for bankruptcy, but obtained an Amdahl Corp. V/5 on a six-year lease anyway — because of the attractive price.

The pharmaceutical company minimized its risks when it could not dig up any information on OPM's financial situation, the official explained.

"The majority of DP managers never read lease documents," he warned. "Users must understand what they are signing."

Contributing to this report was Staff Writer Deborah Wise.

Rags to Riches, Riches to Rags

By Tim Scannell
CW Staff

NEW YORK — As little as a year ago, OPM Leasing Services, Inc. could have been a prime example of the typical rags-to-riches American success story — a story with the kind of stuff found in dreams, books and Hollywood movies.

Unfortunately, the company's Horatio Alger image recently went sour and the dreams came crashing down.

Founded by two boyhood friends who grew up in Brooklyn, attended Brooklyn College and eventually became brothers-in-law by marrying sisters, the company started as a small neighborhood store that rented air conditioners. Mordecai Weissman and Myron Goodman eventually branched out into the lucrative computer field, changing their selling spiel from air conditioning BTUs to IBM CPUs.

Weissman, the 33-year-old president of the firm who was forced out late last month when he refused to answer questions during bankruptcy proceedings, was the firm's marketing whiz who liked to stay behind the scenes, wheeling and dealing with customers and Wall Street investment banking firms.

Goodman, on the other hand, was the company's workaholic executive vice-president who handled administrative matters and kept employees — many of whom were relatives — in line. In fact, he drove himself so hard and at such a frenetic business pace that the now 34-year-old Goodman was fitted with a pacemaker a short time ago.

Goodman resigned from the company on Feb. 26 and has been hidden from the public and press ever since.

OPM Reps May Lose $200,000 in Commissions

By Deborah Wise
CW Staff

NEW YORK — Users are not the only ones who are losing out now that OPM Leasing Services, Inc. has filed for bankruptcy. OPM salesmen mentioned in the summary of liabilities submitted by the company stand to lose up to $200,000 in unpaid commissions. And these people had no idea the company was in trouble.

"It wasn't until they filed for Chapter 11 that I knew of anything," said one stunned OPM salesman who claimed he is owed nearly $100,000 in commissions.

"Commissions always lagged behind. I received my last payment around February. It was a partial payment," said Thomas Muehlbauer of OPM's Houston office.

"Myron [Myron Goodman, coprincipal of OPM] ran the whole financial end. People would get paid when they got paid," Muehlbauer added.

Another source close to the company said that he knew of several people who had not been paid up to $20,000 in commissions and others who fell into the $85,000 to $100,000 range. He himself stood to lose upwards of $200,000. He said that as a rule commissions and salaries had not been paid on a regular basis, rather "with the flow of things."

Employees of OPM told *Computerworld* that the reporting in the press to date had upset them because it mentioned types of leases that they had never had anything to do with.

These leases involved an "easy out" clause and were potentially very risky. The sales people interviewed had joined the company between two and three years ago. They said the kinds of deals they were arranging most frequently were one- to three-year leases with the financial institutions involved being paid directly by the lessee.

Rockwell Dealings

The fraudulent dealings allegedly carried out by OPM in regard to its business with Rockwell International Corp. also came as news to OPM employees.

According to documents filed in federal district court in Manhattan, Rockwell International is quoted as having uncovered the existence of "discrepancies" between what Rockwell believes it owes on computer leases and what the financial institutions are asking for.

Suits filed in the Manhattan court allege that OPM obtained more than $10 million in loans from institutions by presenting what were supposed to be computer equipment leases signed by Rockwell International officials. The plaintiffs alleged that the documents were forged, altered or did not legally exist.

One source at OPM, who wished to remain anonymous, claimed that only Myron Goodman dealt with the Rockwell account because it was the largest OPM had.

Apparently Goodman flew to Los Angeles about every other week to do business with Rockwell. "Nobody was involved with Rockwell except Myron," the source said. He also said it was impossible to get any information on the Rockwell account because Goodman kept the files.

"As far as I know, Myron was the only person who had direct dealings with Rockwell International," an OPM spokesman said.

Although sources to date have mentioned $100 million as a total amount of the money involved in the allegedly fraudulent dealings in which OPM may have been involved, one source quoted a figure that could reach from between $130 million to $190 million for the Rockwell case alone.

Recent reports of an investigation into OPM suggest that no evidence has been found to date to suggest that former OPM president Mordecai Weissman was involved with the alleged fraud scheme.

"There was no surprise on my part that Mordy [Mordecai Weissman] didn't know what was going on. He was president in name only, but Myron ran the company," Muehlbauer said.

Muehlbauer added that eight of OPM's regional offices have been shut down in Los Angeles, Denver, Montreal, Toronto, Atlanta, Boston, Minneapolis and New Jersey. He estimated that between 40 and 100 people had been laid off.

OPM Leaseholders Could Lose Millions

(Continued from Page 4)

lease, one lessor contended.

As presented by OPM, lessees could opt for early termination of the lease, with OPM assuming the liability to the financial institution for the loan on the equipment.

However, some lessees were shocked to find out they had "hell or high water" leases — they were responsible for lease payments no matter what OPM promised in side agreements, noted Edward Cherney, president of CMI Corp.

OPM early on wrote so many indemnity-type leases that it could not possibly be there when users opted out of long-term leases, Cherney said. Even if the company had not been charged with writing fraudulent leases it would have folded because of the pyramid effect of the indemnity leases.

Filesaver

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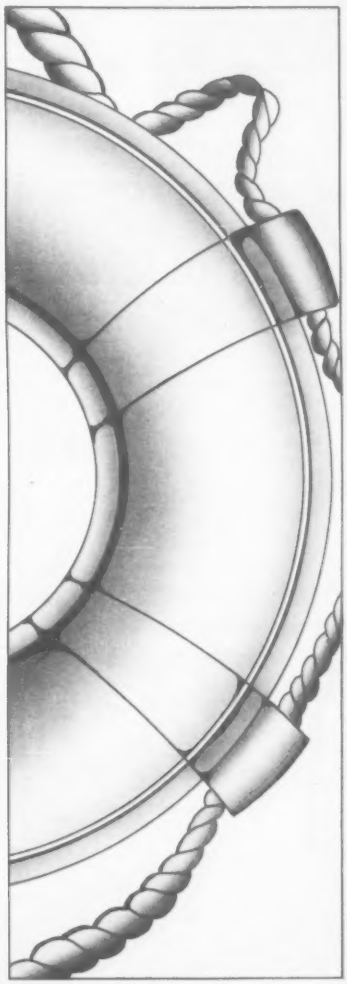

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GTE to Bring Out Low-Cost Phone Terminal

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — A low-cost, microprocessor-equipped dial-up telephone terminal that includes a full Ascii keyboard and CRT display will be unveiled by GTE Telenet, Inc. this fall, Marketing Vice-President David Horton reported here last week. The anticipated price will be from $500 to $1,000, he said, adding that "we hope to begin commercial deliveries in mid-1982."

The new GTE terminal was designed primarily for "middle-level business managers who need a low-cost, user-friendly device that can support data base access and electronic mail applications," Horton explained during an interview at the Interface '81 conference.

"We expect that the terminal, because of its attractive price, will greatly expand the market for electronic mail and data base retrieval services, particularly among companies that find present offerings too expensive," Horton said. The terminal can support videotex services, among other data base applications, he added, and ultimately might become a home videotex terminal.

News of the GTE Telenet terminal surfaced approximately two months after Northern Telecom, Ltd. announced it had begun field trials of a competing Displayphone in Canada and the U.S. Other entrants, possibly including AT&T, are virtually certain, and a spirited competitive battle is likely.

CW at Interface '81

Terminal Capabilities

GTE's terminal will be manufactured in France by Thomson-CSF under a contract providing for delivery of 35,000 units during a two to three year period. Thomson-CSF is one of three firms building an electronic directory terminal that the French telecommunications administration soon will begin to distribute free.

"Our terminal is a different product, with capabilities that go well beyond those being offered to French telephone subscribers," Horton said. "But through the use of some of the components and manufacturing processes developed for the directory terminal, costs have been kept down."

The GTE terminal will communicate with any data base that utilizes Ascii format, will feature a number of "soft" keys that automatically establish communication with user-specified data base services and will include a set of CRT-displayed cues designed to help the user through the information-accessing process. Built-in diagnostics will also be provided.

The number of lines depends on whether GTE provides a 9-in. or 12-in. CRT screen. This is one of several questions still under study, Horton said, and graphics capability is another. "We are looking at the three best-known formatting schemes — the French Antiope system, Canada's Telidon and Britain's Prestel/viewdata — but haven't yet made a choice."

Codex Voiceband Modem Among Conference Debuts

By Brad Schultz
CW Staff

LAS VEGAS — Codex Corp. last week introduced a 14.4K bit/sec voiceband modem at the Interface '81 conference here while, in simultaneous announcements, General Datacomm Industries debuted four new modems and Alanthus Data Communications Corp. unveiled a terminal controller.

The Codex SP 14.4 employs a signal processing architecture rather than a conventional microprocessor implementation and is rivaled only by Paradyne Corp.'s MP 14.4 modem as a commercially available voiceband set at the 14.4K bit/sec speed level [CW, March 16]. With a unit price of $9,950, the Codex high-speed modem costs 30% less than the tag Paradyne recently quoted for its fastest voiceband set.

The SP 14.4 was designed for point-to-point data network applications, a Codex spokesman said, with or without a six-channel buffered multiplexer. With the optional multiplexer, SP 14.4 users can reportedly combine two, three, four, five or six inputs with a wide range of data speeds.

According to a Codex spokesman, the SP 14.4's signal structure features hexagonal packing on a triangular grid. "When compared to rectangular grid structures," he said, "this provides greater immunity to line impairments, such as noise and phase jitter. Conventional microprocessors do not have the necessary processing power to support this approach."

This unusual architecture was developed by Ese, Ltd., a Canadian subsidiary of Codex, which in turn is a subsidiary of Motorola, Inc. Ese also provided a patented "data-transparent internal error-correction mechanism" in the SP 14.4 modem.

The error-correction circuitry was said to allow the best voiceband modem performance currently available at 14.4K bit/sec. While Paradyne engineers think that one over in Largo, Fla., Codex executives predicted many applications for data communications swifter than 9,600 bit/sec — still the fastest popular voiceband pace.

Codex also picked Interface '81 to introduce two new models for its 6000 series of Intelligent Network Processors (INP). The models 60110 and 60120, known collectively as the 6001 INP, handle data traffic for clusters of four or eight asynchronous terminals, respectively, and fit 4,800- or 9,600 bit/sec modems.

The 6001 INPs increase transmission efficiency by statistically multiplexing data, a spokeswoman explained, and also feature error protection. Prices begin at $1,975.

And Codex chose the annual data communications conference to announce a minicomputer-based system for network management, the DNCS 400, that allows users to perform continuous on-line monitoring of network performance.

The statistics-generating DNCS 400 is based on a 512K-byte minicomputer with 12.5M bytes of hard-disk storage, 1.2M bytes of floppy-disk storage, a 30 char./sec terminal, 180 char./sec printer and other peripherals. A typical system configuration, according to a Codex spokeswoman, is priced at $85,000.

Codex is headquartered at 20 Cabot Blvd., Mansfield, Mass. 02048.

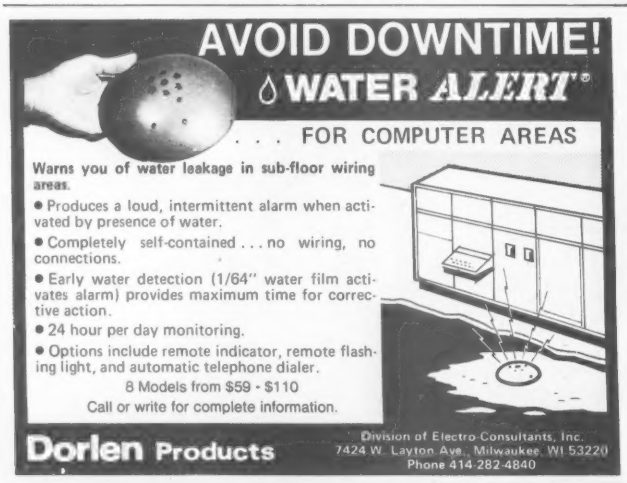
General Datacomm Industries announced four modems at Interface: the Localynx GSU-1 for local data distribution over phone company channels; the 202 S/T, which runs at up to 1,200 bit/sec over the switched network and up to 1,800 bit/sec over private lines; the 212A, for 300 bit/sec asynchronous and 1,200 bit/sec asynchronous or synchronous operation; and the 300 bit/sec 103J-L for small business and home computer users.

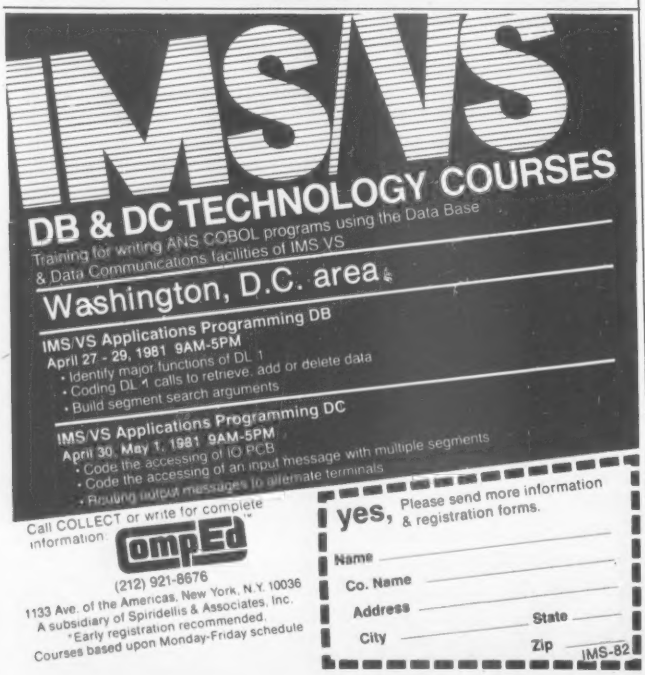
The Localynx GSU-1 synchronous modem can run at 2,400-, 4,800- and 9,600 bit/sec and costs $850. The 202 S/T is end-to-end compatible with AT&T's Model 202 modem and can be mounted in a 16-card slot shelf without modification; it costs $550.

General Datacomm's 212A and 103J-L modems cost $840 and $199, respectively. The vendor's address is One Kennedy Ave., Danbury, Conn. 06810.

Alanthus Data Communications unwrapped its C-80 terminal controller/concentrator at the conference. The product enables dumb terminals to communicate with "sophisticated" equipment in an IBM 3270 environment and can maintain simultaneous data link hookups with two separate host mainframes or networks.

An M/A-COM, Inc. subsidiary, Alanthus is at 6011 Executive Blvd., Rockville, Md. 20852.





In 45 to 50 Cities

Tymnet to Ask FCC for Wideband Dems OK

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — Tymnet, Inc. will shortly request Federal Communications Commission (FCC) permission to offer wideband local exchange services in 45 to 50 U.S. cities, an official of the company reported at the Interface '81 data communications conference here last week. Using existing local cable TV networks and a new microwave transmission scheme, the company will be able to put up to 1.5M bit/sec of transmission capacity on the user's doorstep.

The new service will be an outgrowth of an FCC decision last January, which established a digital electronic message service (Dems). Sparked by Xerox Corp.'s Xerox Telecommunications Network (Xten) system development, the FCC decision addresses what is probably the most pervasive problem confronting data communications network users today — the lack of an alternative to telephone company-provided analog local loops.

Although a number of carriers are likely to apply for licenses to provide digital electronic message service, Tymnet may be at the head of the pack.

Several months ago, the company acquired Microband Corp., which provides specialized broadcast TV services in most of the nation's major cities. The microband acquisition gives Tymnet choice locations for the microwave transmission facilities it will need for the new local exchange service. Good sites are scarce and expensive in the bigger metropolitan areas.

Transmission Test

Tymnet also is participating with Satellite Business Systems (SBS) and others in a cross-country transmission test that will connect broadband local distribution facilities in San Francisco and New York City via two 56K bit/sec satellite channels. The test is scheduled to begin in June and will run at least three months.

Manhattan Cable Co.'s coaxial network will be the local distribution system in New York, while in San Francisco a combination of cable and microwave will be used. The software for interfacing these facilities to the SBS satellite channels was developed by Tymnet.

The upcoming test is clearly intended to be the model for a nationwide end-to-end, all-digital data communications network that is as accessible to data communications users as today's telephone network is to voice users. The Tymnet source indicated what this new capability will mean to the user when he explained that today, in a typical city, it costs $200 per month to lease a 9.6K bit/sec local loop from the phone company, plus $600 per month for each of the two modems required.

"The modems can be purchased, of course, at $5,000 apiece," he added. "By comparison, our microwave system can deliver 256K bit/sec of transmission capacity — 25 times more bandwidth — to that same user's site for about half of AT&T's price."

Tymnet's network plans were disclosed here last week after the company officially announced installation of the "keystone for the totally integrated, multimedia networks of the '80s," as Vice President Art Caisse put it. The "keystone" consists of a nodal processor that will control the interchange of message traffic in San Francisco during the upcoming test among the SBS satellite channels and the two local distribution networks.

"Growing demands for bandwidth and circuit availability in the '80s will have its greatest impact in local intra/inter-city distribution networks," Caisse pointed out. Since "you can only go so far on AT&T copper alone," the need for an alternative is clear.

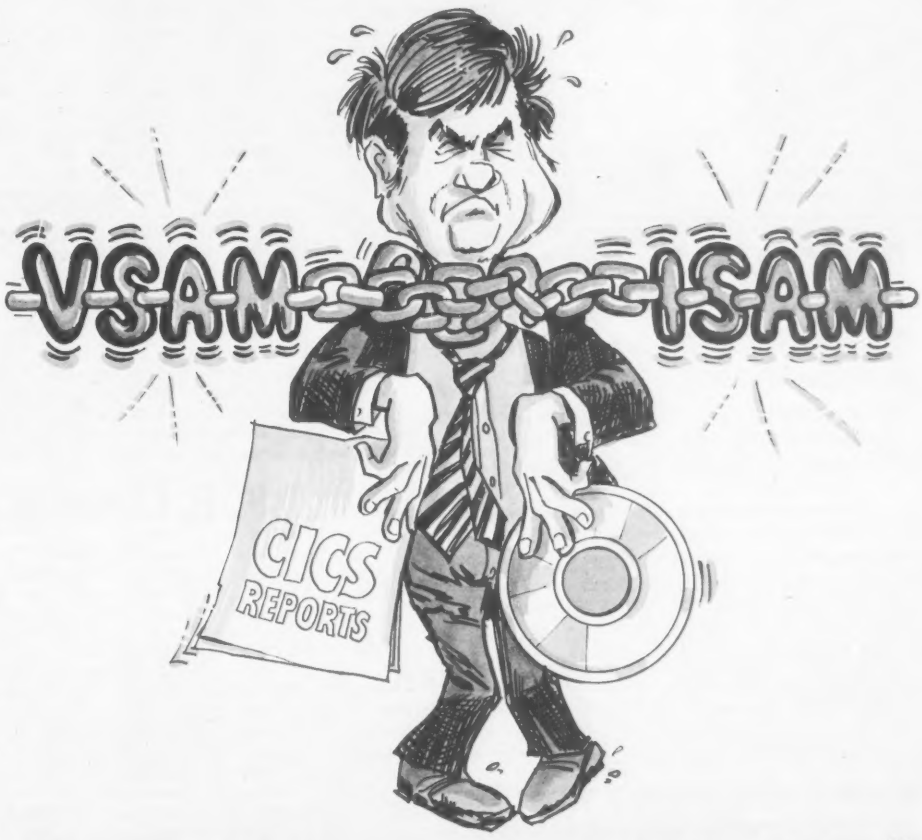
How soon this alternative will become available to a significant number of data communications users is the big unknown at the moment.

CW at Interface '81

Tymnet and other prospective operators of Dems are waiting for the text of last January's FCC decision to be released. They will then request frequency allocations. The commission's decision is likely to be forthcoming within the next few weeks; but since a number of carriers are likely to file, there may be a protracted battle for frequencies.

"We hope users, individually and collectively, will keep the FCC's feet to the fire and push for quick action on the applications" said the Tymnet official quoted earlier. "It's in their interest as well as ours."

In related news, Tymnet will request, within the next month, authority from the FCC to become an international record carrier (IRC). The company's basic goal is to extend its On-Tyme electronic mail and message service overseas.



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Anderson Warns U.S. May Lose World Lead

(Continued from Page 1)

DP and communications, according to Anderson, who was born in China, lived for years in Japan and is a British citizen.

He said, "We can't even quantify the respective values and benefits of the six basic types of networks because there is little agreement among vendors or users on how best to develop them, or how interconnection among them is to be achieved."

CW at Interface '81

Six Net Types

These six types of data networks were identified as:

- Local-area networks for inside private facilities.
- Partial store-and-forward systems, as used in packet switching.
- Circuit-switching networks offered by common carriers.
- Accept-and-forward systems "as employed by NCR Comten as part of its Communications Network Architecture (CNA) and by IBM in the Systems Network Architecture (SNA)."
- Store-and-forward systems suitable for electronic mail "at flexible rates."
- Datagram systems "which could transmit standard messages at a low cost to any point in the world."

No two users have the same requirements, so all six network types are needed, the NCR chairman noted. Vendors may have devised too many approaches to implementing each network type, he declared, and the industry lacks adequate mechanisms for evaluating the relative strengths and weaknesses of these approaches.

Also, users have discovered their communications costs are "getting out of hand," Anderson said. "Costs are pure and simple operating costs. They cannot be depreciated, and they earn no investment credits."

In other words, users are piling on many kinds of devices and software to establish facilities appropriate for their respective situations. While this may boost throughput, an economic benefit in itself, the trend also raises inflation-sensitive maintenance and personnel costs, along with indirect costs, as the organization adjusts to new facilities and procedures.

Unlike expenditures for equipment acquisition and plant renovation, these operating costs of communications do not qualify the user for financial relief through tax breaks.

Standardization and communications compatibility among different brands of computer systems would make it easier for users to determine which products and services are best for particular applications, Anderson indicated. Vendors would have more incentive to enhance capabilities and lower costs, he suggested, if they played more by the same rules, to an extent supporting each other's product lines by offering equipment to run in multivendor networks.

"Openly agreed upon methods and procedures for interconnection of different manufacturers' equipment across publicly owned communications resources are not only desirable, but increasingly obligatory," Anderson stated.

Few vendors, however, "are immune to the not-invented-here disease," he continued.

NCR to Back Net Standards, OSI

By Brad Schultz
CW Staff

LAS VEGAS — NCR Corp. Chairman William S. Anderson last week said NCR is "fully committed to support" the X.21, X.25 and X.75 proposed data communications standards.

NCR also supports the concept of Open Systems Interconnection (OSI) — the International Standards Organization's evolving model for data networking — Anderson told the Interface '81 conference here.

"OSI can, and I believe will . . . help the industry cut its way out of today's jungle of systems incompatibility," Anderson stated. In Japan, where he spent a third of his career, Nippon Telephone and Telegraph Co. "pioneered in digital data transmission, including X.21 circuit switching and X.25 packet switching," the NCR chairman noted. X.75 is a method for latching together networks based on X.25 and X.21.

"The Japanese are coming and they are coming in force," Anderson warned in explaining why the U.S. may lose its lead over other nations in data communications. By committing themselves early to design standardization, Japan and some European nations have simplified opportunities for overtaking the U.S., he pointed out.

But sitting in the audience at Anderson's keynote address, Georgia Institute of Technology Prof. Philip H. Enslow Jr. shook his head in disbelief while Anderson expressed devotion to OSI. Enslow leads what he calls the nation's largest academic research program in distributed data processing and is editor in chief of *Computer Networks*, an international scholarly journal.

"NCR has opted for IBM's Systems Network Architecture (SNA), not OSI, as their standard architecture," he told *Computerworld*. NCR Comten's Communications Network Architecture (CNA) was designed to fit between two SNAs, in some cases with an intermediary X.25 interface, he maintained.

NCR Loses $2.3 Million Suit

(Continued from Page 1)

temporarily they said," Depper related. "NCR, unbeknownst to us, had a meeting with the service manager, the assistant service manager and the service engineer. They decided then to chip the serial numbers off both disk drives and switch them around.

"They further decided at the meeting not to tell The Glovatorium anything about this," Depper continued. "This came out at the trial when the assistant service manager and engineer took the stand and admitted to what went on."

Blind Ad

Depper said his case against NCR was bolstered by a blind advertisement placed in *Computerworld* Aug. 18 asking System 8200 and Spirit users who had experienced any problems with the hardware or software to contact him. The ad resulted in over 50 replies from disgruntled 8200 users.

A phone call from a principal of the Denver firm of Kenz and Leslie was allowed as evidence during the trial, and "the testimony there showed that NCR had run an 8200 pilot system which almost put that company out of business in 10 months of use," Depper said.

"They clearly knew the system was inoperable, at least in the way they were representing it to us in 1975," Depper said. "They had no service engineers in this area who could make the software function as they said it would, and they admitted at the trial they have a 50% failure rate on replacement parts for their hardware. I think we should have been told this sort of thing before we bought."

Depper charged that he and his father, company president Robert Depper, were shown demonstration models of the 8200 package that uniformly did in 15 minutes what the system they bought could do in no less than four hours. He said the only on-line procedure possible was at the order entry stage, the remaining functions being left to more time-consuming batch processing, unlike what he said he was shown before buying the system.

Perez said NCR came forth with an out-of-court settlement prior to the trial, "but it was a matter of being a day late and a dollar short." Perez added that other 8200 users have contacted his office and discussed the possibility of other suits against NCR for fraudulent misrepresentation.

The Glovatorium, meanwhile, still has its 8200 lying idle, having replaced it last year with a comparably priced Basic/Four Corp. Model 4410 which, Depper said, is "working just fine."

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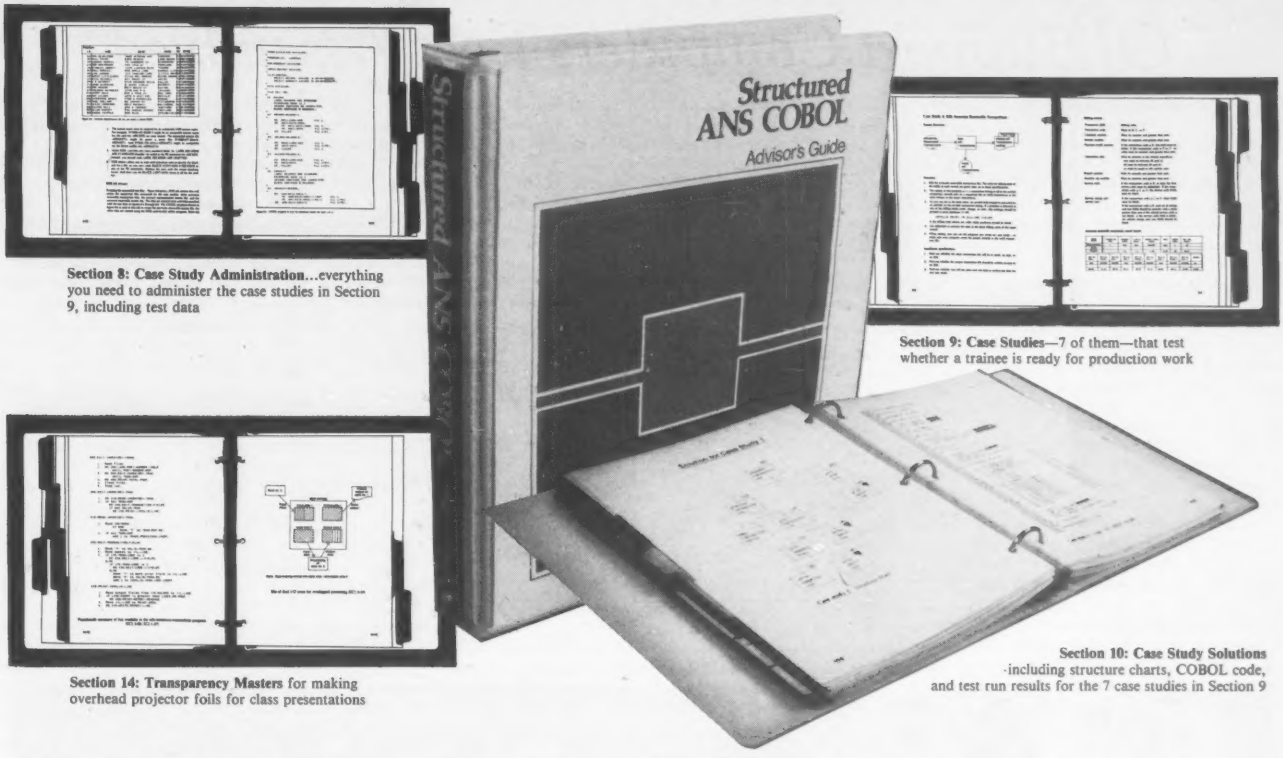

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'Columbia' Lift-Off Backed by Largest Set Of Support Computers Ever Assembled

By Tim Scannell
CW Staff

KENNEDY SPACE CENTER, Fla. — Barring any mechanical gremlins or weather-related difficulties, the Space Shuttle *Columbia* will lift off about 45 minutes after sunrise on Friday to begin its 2.3-day flight into aviation history.

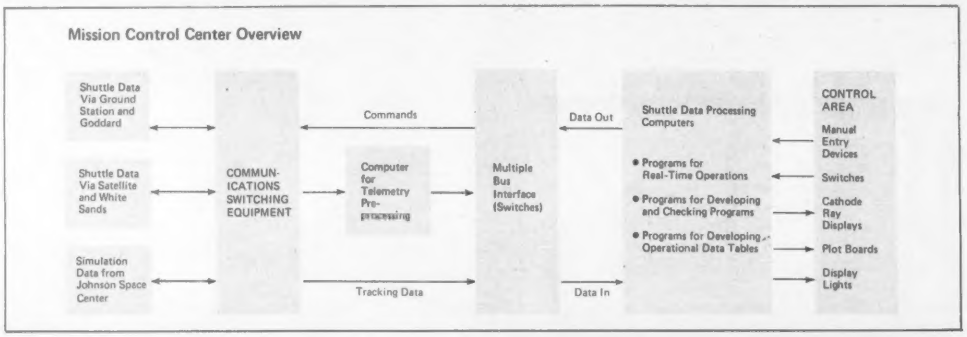
Traveling with the $9 billion rocket-plane and its two-astronaut crew will be the largest assortment of onboard and ground-based support computers ever assembled for a U.S. space mission. Computers will be used not only to orchestrate the prelaunch activities leading up to the shuttle's fiery departure, but also to monitor and control *Columbia* every second of the brief shakedown flight.

In fact, just hours before lift-off a sixth 55-pound IBM System/4 Pi Model AP-101 computer will be added to the five already on-board the shuttle as a sort of security blanket against the effects of Murphy's Law. The small computer, which can be activated by Capt. Robert L. Crippen, *Columbia's* pilot for the initial mission, will contain a series of "come home" programs that will direct the shuttle back to Earth and a safe landing in the event of a widespread systems failure.

Vantage Points

The *Columbia* will be tracked and monitored from a variety of processing and tracking stations around the world, but the bulk of the activity will occur at two National Aeronautics and Space Administration (Nasa) vantage points: the Kennedy Space Center launching site here in Cape Canaveral, Fla., and the Mission Control Center at the Johnson Space Center, just outside Houston, Texas. Control of the shuttle will be handed over to Mission Control seconds after the rocket clears the "launch tower" for the remainder of the historic flight.

Most of the computers and programming for the Space Shuttle program is provided by IBM, which supplied the six guidance and control computers on board the orbiter vehicle; designed the Launch Processing System and Cargo Integration and Test Equipment System at the Ken-



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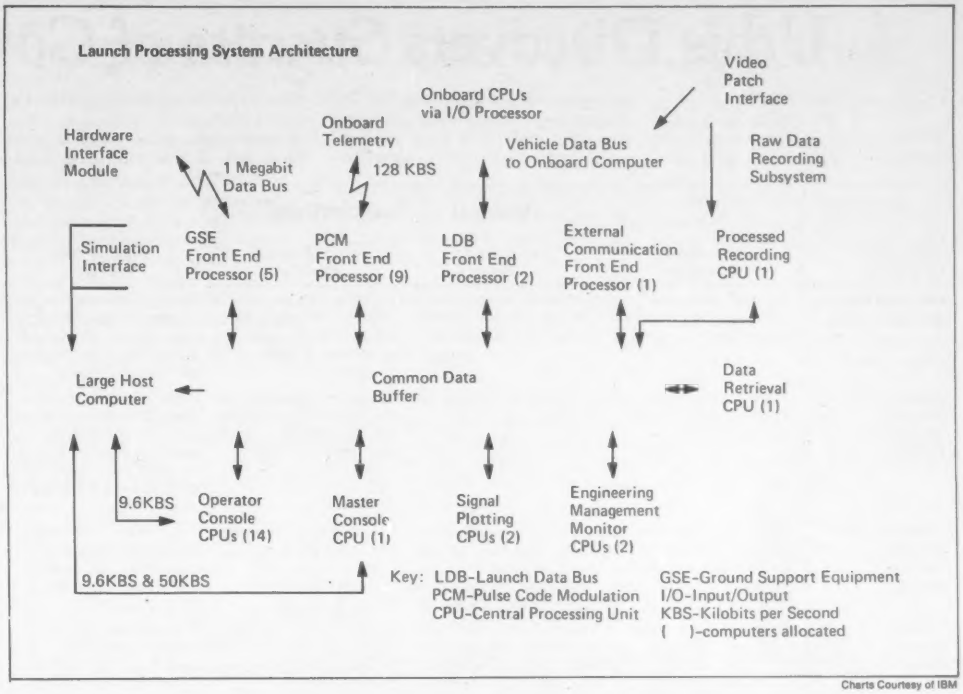


Charts Courtesy of IBM

nedy Space Center; and coordinated systems design for the ground control facilities at the Texas facility. In fact, IBM participated in all previous space programs conducted by Nasa, including Mercury, Gemini, Apollo, Skylab, and the joint Apollo-Soyuz Test Project.

Because of the complexity of the computers installed on-board *Columbia*, shuttle pilot Crippen and commander John W. Young will have relatively little to do compared with what was necessary during earlier space shots.

Basically, the five redundant AP-101 computers will help the astronauts wade through all the complexities of extraterrestrial guidance, navigation and control, help with system management and simplify prelaunch and in-flight checkout procedures. During flight, the computers will be linked to 38 subsystems on the orbiter and four on the solid rocket boosters, checking and rechecking vital shuttle operations.

Messages from the four subsystems connected to the booster rockets are particularly important because *Columbia* will be the first manned space flight using solid fuel booster rockets. Previously, booster rockets were fueled with liquid propellants. In addition, no previous space vehicle has been manned on its maiden flight.

Crippen and Young will be able to communicate with the computers and receive graphs, trajectory plots and prediction data about flight progress through one of three 5-in. by 7-in. CRT display units located in the orbiter's pilot-to-pilot console. A fourth CRT station is installed in the mission specialist station, situated directly behind the pilot's seat.

The Space Shuttle's computers are programmed with four sets of applications programs that handle everything from payload processing to directing *Columbia* on its roundtrip journey to the edge of space. In fact, one program, handling guidance and control, will play a vital role toward the end of the mission when the shuttle lands 747-like, gliding in at more than 200 mph on a dry-lake bed at Edwards Air Force Base in California.

The programs are written in HAL/S, a software language specially developed for avionics.

For those who think in Guinness world record-type terms, the computers are 40 times faster, have five times the memory capacity and carry eight times more instructions than the on-board data processing systems of the Apollo-carrying Saturn V rockets, similar to the one that propelled Neil Armstrong and crew to the first successful landing on the moon's surface.

Launch Systems

The launch countdown and prelaunch checkout will be handled by a relatively new computer system installed here at the Kennedy Space Center. The Launch Processing System basically consists of eight autonomous launch processing sites, each of which has a network of up to 40 Modular Computer Systems, Inc. Mod Comp II/45 minicomputers. To handle the burden of checking and rechecking on countless small, yet important, prelaunch chores, each site employs 1.8 million software instructions in its operating system and support software repertoire. The minicomputers are linked to a number of color CRT terminals that provide real-time control and monitoring or communications with one of two Honeywell, Inc. large-scale Model 6680 host computers for offline processing.

Because *Columbia* will be carrying no payload on its maiden voyage, except for an assortment of test equipment, the Cargo Processing System will not be in full operation. However, on subsequent shuttle flights, the system — consisting of about 100 racks of electronic and computer equipment and more than 800 cables that can be linked to the minicomputer and the host computers in the control room — will be used heavily.

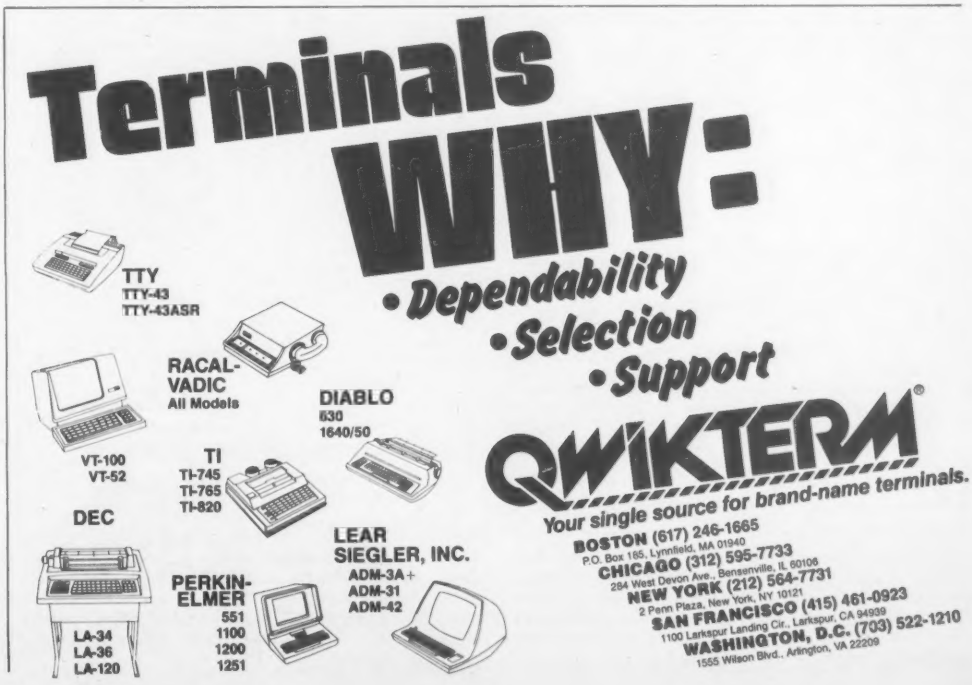
Basically, the system tests the electrical connections and simulates the functions and activities of cargo during the prelaunch preparation.

IBM engineered both the Launch Processing and Cargo Processing systems, developed the systems programming and integrated the hardware and software at each site.

As *Columbia* speeds on its 36-orbit flight around Earth, its progress will be monitored by three IBM 370/168 computers and a jungle of communications equipment at the Johnson Space Center. Each computer has about 8M bytes of memory and a variety of data channels that act as tiny processors.

Most of the system programs on the computer are standard IBM products that have undergone little or no modification to interface with real-time devices at Mission Control. These system programs include: JES/3, TSO, IMS/VS, VTAM/NCP and real-time support access method. The applications programs, developed mostly by Rockwell, Inc., include such standard aviation packages such as trajectory, telemetry, command, network communications and control.

During the shuttle's conception, the computers at the Texas center were used to support program development, payload data processing, flight controller training and testing activities.



Urbis Discovers Success of Government DP

By Brad Schultz
CW Staff

IRVINE, Calif. — Researchers here found mixed success for local government computing in the U.S. because many cities they investigated since the mid-1970s have environments that discourage prudent implementations, while other cities are more fortunate.

Computing "leaves a bad taste in our mouths," Brockton, Mass. councilmen told the Urban Information Systems (Urbis) Research Group. Police at nearby Quincy, Mass., had their system unplugged and escorted to city limits.

But New Orleans computing benefited from a campaign to import needed DP experts, and Urbis found Kansas City, Mo.'s computing "effective" because the city department heads and other factors important to the outcome of DP have worked well together.

'The most automated tasks in local governments are the most routine tasks . . . But the automation of routine tasks is quite complicated in many cases, so complicated that no member of the DP staff, let alone the city's top management, fully understands how the whole thing works.'

The dynamics of computing reach beyond the activities of DP personnel, Urbis noted, and what really determines whether computing benefits an organization is what the Public Policy Research Organization (PPRO) scientists call the "computing milieu." At the center of the milieu is the "computing package," which includes the organization's DP staff, the hardware and software they apply and the procedures and management policies that structure applications.

Much goes on outside the package that decides whether the package benefits the organization. In a forthcoming book, *Computers and Politics*, Urbis researchers present conclusions about how the package affects politics within the nation's local governments and, ultimately, the governments' accountability and service to the public.

Routine Tasks

The most automated tasks in local governments are the most routine tasks, Urbis concluded. But the automation of routine tasks is quite complicated in many cases, so complicated that no member of the DP staff, let alone the city's top management, fully understands how the whole thing works.

Much of these routine tasks concern the keeping of records. Factors that complicate recordkeeping include legal constraints intended to ensure privacy and confidentiality, state and local reporting requirements and use of records by different agencies for different purposes.

While those factors descend on the computer package, the package itself changes as applications are upgraded, new applications are created, the technology develops, DP personnel move about, service contracts are modified and the city's various computing operations become more interdependent.

While all this makes city DP more difficult to understand and control, Urbis concluded that computing reinforces the power and influence of the city's dominant coalition. Local government computing is "inherently undemocratic," according to the

Dimension of Comparison	Alternative Perspectives: Managerial Rationalism	Technocratic Elitism	Organizational Pluralism	Reinforcement Politics
Dominant mode of decision-making	Rational assessment of costs and benefits to the organization as a whole.	Technical assessment of the optimal design and utilization of the technology.	Pulling and hauling among coalitions of groups within the organization, given the constraints of hierarchy in subunits.	Political assessment of decisions as they affect each actor's ability to maintain and enhance his position within the organization.
Basis of control over decision-making	Formal position and authority in organizational hierarchy.	Monopoly of technical expertise.	Variety of resources, including authority, expertise, time, ability to resist and nature of coalition.	Direct and indirect influence on lower level operatives, who anticipate the reactions of those controlling the organization and attempt to serve those interests.
Locus of control over decision-making	Those at the top of the organizational hierarchy — top managers and elected officials (managers, mayors, council members).	Technical experts (computer experts, management and planning analysts skilled in the use of computer-based systems).	Varies across decisions and especially across decision domains.	Those who dominate the prevailing structure of influence within the organization (varies from organization to organization).
Dominant interests served	Organization as a whole.	Maintenance and enhancement of the role within the organization of the technology and the technical experts.	Groups benefit differentially over time and across different kinds of decisions and issues.	Reinforce the power and influence of those who already have the most resources to influence organizational decisions.

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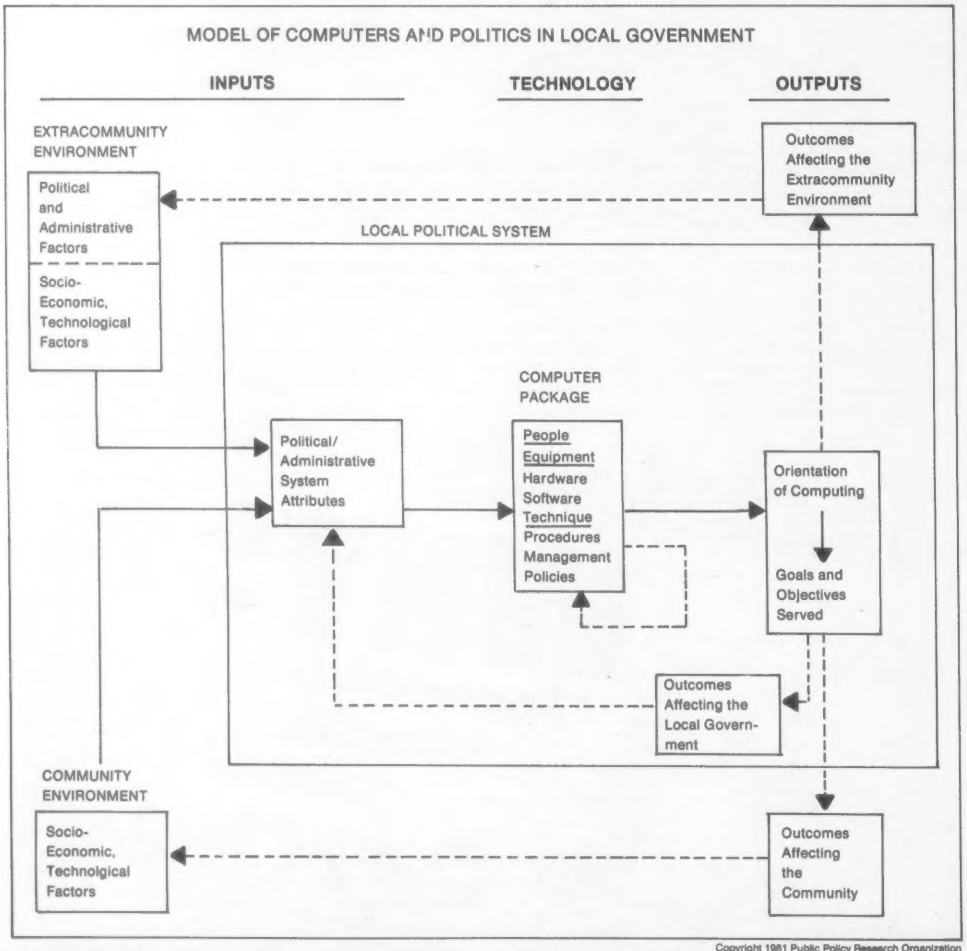

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The Public Policy Research Organization scientists, known as the Urbis Research Group, decided to study local government computing within the context of bureaucratic politics, the pressures exerted on agencies by the public and the eventual impacts of automated government operations on the public.

The "Computer package" (center of diagram) that involves government DP professionals is thus only part of the picture.

Urbis found that an "information elite" exists in many cities and counties that manipulates DPers to advance particular policies.

Depends on 'Computing Milieu' of U.S. Cities

"reinforcement politics" paradigm the PPRO scientists claim best explains the phenomenon [CW, March 30].

Two critical determinants of whether local government computing succeeds are the government's "general value orientation" and "the nature of control over decisions regarding the computer package," Urbis stated. Although the coalition said to dominate any city may not see this connection, it normally gains clout as computing is extended.

Computing Politics

In some cities, however, the politics of computing creates conflicts among coalition members, some of whom regard the city's systems as simply political tools, Urbis indicated. This strife may proceed outside the public's general awareness, while affecting the performance of critical municipal operations.

At Brockton, an industrial city of some 90,000 people located south of Boston, "both the city council and city administration were characterized by factionalism and fragmentation, with the government organized into fully 17 independent departments and nearly a dozen semiautonomous boards," the PPRO researchers noted.

As Brockton began implementing computers, its ward-based politics and sagging economy depressed the level of usage in the city, and local officials had unrealistic expectations about the computer package, Urbis maintained. Brockton's police department was "in total disarray" in the late 1960s; the city council appointed seven police chiefs in seven years.

"In 1975, an outside consultant presented a devastating report on local police operations, criticizing nearly every aspect of police activities and organization," Urbis said. When Brockton hired its first police chief to come from outside the city, "he faced a deeply divided police force resistant to reform."

The new chief tried to implement some of the 294 actions recommended by the outside consultant, but gave computing a low priority because he realized it would provoke staff resistance at a time when basic structural reforms were imperative.

Urbis called Brockton an example of a "sterile milieu for the growth of computing." Nearby Quincy, a suburban-industrial city about as large as Brockton, also features patronage and competition among factions in its government, Urbis declared.

Although Quincy's computing milieu was also termed sterile, the city did have sophisticated computing for a while under a large grant from the federal Law Enforcement Administration Agency (LEAA). A system called Hypercube developed by MIT Prof. Richard Larson was implemented to optimize allocation of police patrols.

While many in Quincy were enthusiastic about Hypercube, the Massachusetts city's policemen were not, according to Urbis. Quincy's mayor and police chief at the time reportedly felt Hypercube would undermine their political influence and had its plug pulled.

This is the second article in a seven-part series on how computing affects local government. The series is based on soon-to-be-published research conducted by the Public Policy Research Organization's Urban Information Systems Research Group.

Computing has done better in New Orleans, however, which hired a private company to develop its computer systems and another company to recruit DP personnel from other parts of the country. In its on-site investigation of 42 U.S. cities, Urbis found New Orleans computing to be exceeding expectations of the city's management.

As Kansas City's police chief, Clarence Kelley (later appointed director of the Federal Bureau of Investigation) argued effectively for funds to extend automation of police functions and struck a deal with IBM to make Kansas City the site for developing special police-related software. The municipal finance director, who considered himself a DP specialist, also worked to extend computing, winning support from other departments by not charging them for access to resources maintained by his department.

Articles in this series on local government computing summarize portions of Computers and Politics, *a book by James N. Danziger, William H. Dutton, Rob Kling and Kenneth L. Kraemer to be published by Columbia University Press, 562 W. 113 St., New York, N.Y. 10025.*

Computers and Politics *is the second book from the Public Policy Research Organization's (PPRO) Urban Information Systems (Urbis) Research Group based on the Urbis study of DP at 42 U.S. cities. The first book,* The Management of Information Systems *by Kraemer, Dutton and Alana Northrop, was published by Columbia University Press this year.*

PPRO is an institute of the University of California at Irvine. For more information on Urbis projects, contact Kraemer c/o PPRO, University of California, Irvine, Calif. 92717.

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Former Codex Employee Charged

Equipment Theft of $1 Million Linked to 'Mob'

By Bill Laberis
CW Staff

NEW BEDFORD, Mass. — Investigators here have forged a definite link between the theft of more than $1 million worth of data communications equipment from a local manufacturer and elements of organized crime.

The theft involved four men, now under arrest, who in February and July 1980 allegedly stole high-speed modems, multiplexers and data entry terminals from Codex Corp. in Mansfield, Mass. One of those under arrest is a former Codex employee.

Police said three of the four have previous criminal records and at least two of them are "closely tied to the New England Mob," reportedly headed up by reputed Mafia boss Raymond Patriarca. Patriarca was arraigned last week on unrelated conspiracy charges.

All of the stolen equipment has been recovered, police said.

Arrested and charged with larceny and conspiracy to commit larceny were Anthony Rowell, 53, Lawrence O'Donnell, 41, both Boston-area men, and Jerry Keane, no age given, described as a former company employee. Also arrested was William Kelley, whom police nabbed in Florida and arraigned here on a charge of breaking and entering in the nighttime, in addition to the other charges.

A source close to the investigation said there are other probes under way that link the theft and abuse of computer equipment to organized crime. Authorities are "noticing a lot more of this kind of thing," he added. The case supports contentions made in *Computerworld* recently that organized crime is becoming increasingly involved in the use and abuse of computers and computer crime [CW, March 9].

The arrests and recovery of stolen goods capped a seven-month investigation involving state and local investigators as well as the Boston office of the Federal Bureau of Investigation, all assisted by court-ordered wire taps.

FBI Called In

The FBI was initially called into the case to determine if there had been any interstate transport of the stolen property. Its involvement in the investigation could continue if the FBI invoked its Racketeer Influence Corrupt Organization (Rico) jurisdictional powers, according to FBI spokesman Larry Gilligan.

Gilligan said that the degree of sophistication of the equipment stolen shows an equally high level of sophistication on the part of the men who allegedly pilfered it.

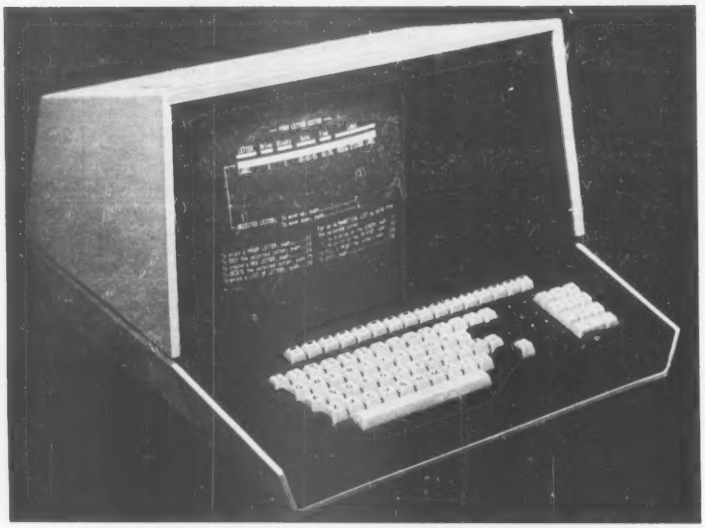
"To fence (sell) it they would have to know a lot about the specialized market they're dealing with, and would have to know just what it is they have, which I'm sure they did," Gilligan said. "They could ship it overseas or sell it locally, but either way they have to know the market and the stuff pretty well."

State investigator Robert St. Jean, who confirmed the organized crime link in the investigation, said the thieves may have been holding the stolen equipment for ransom back to Codex. The data communications and data processing equipment was recovered this February stashed in one semitractor-trailer parked on a roadside rest stop of a local highway, St. Jean said.

"We can't say too much because the investigation is still continuing," he said. "But there are several other irons in the fire regarding this kind of theft. There is a lot more of it going on, or at least we are noticing it a lot more."

Company spokesman Judith Goldstein said the thefts were the first of their kind for the company, adding that Codex officials would beef up security to prevent a recurrence.

NO MEMORY PARITY?
Good luck!



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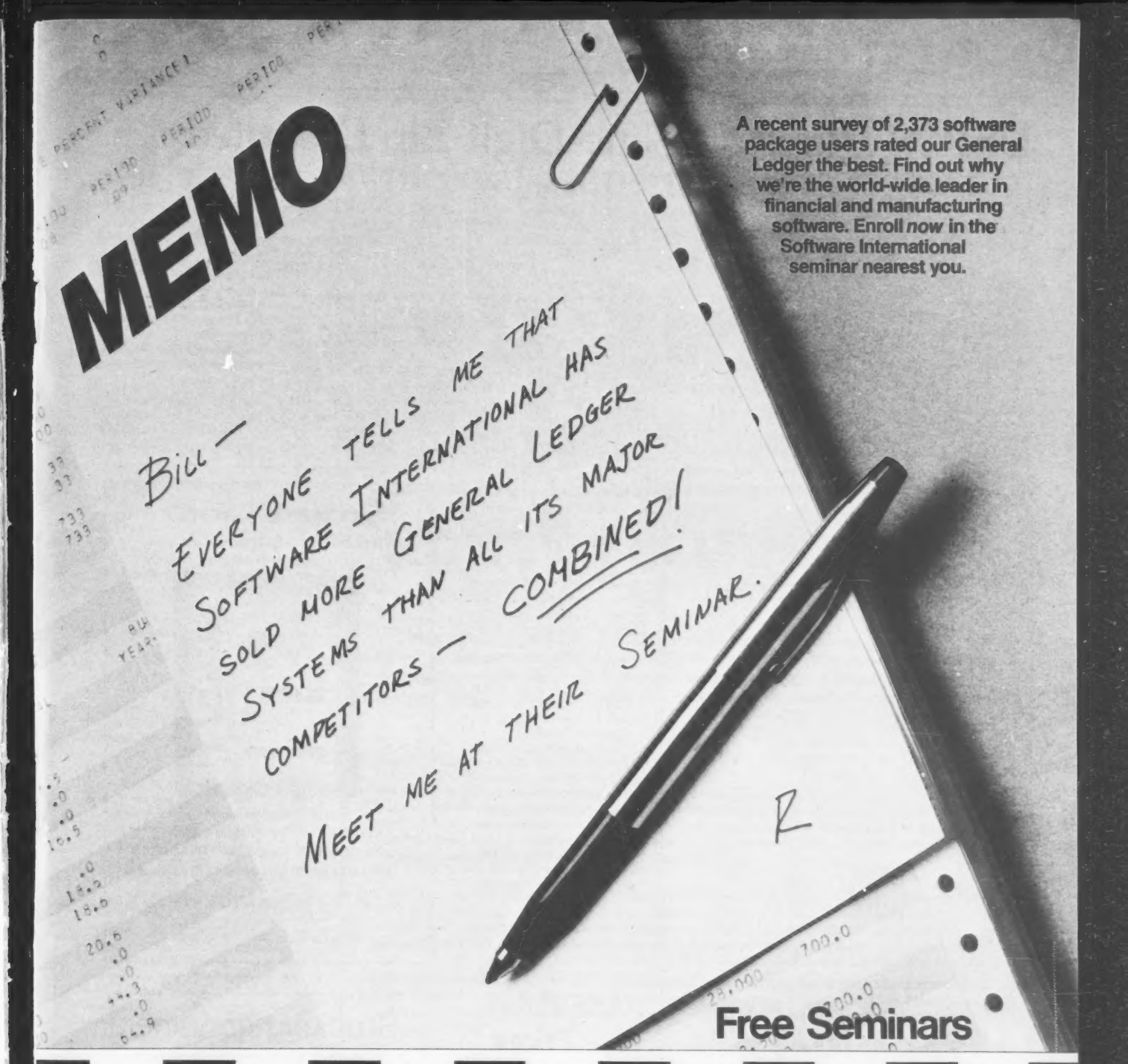
GSD, OPD Tie Service Groups

ARMONK, N.Y. — IBM has consolidated the customer engineering services of its Office Products Division (OPD) and General Systems Division (GSD) into a common group called the Customer Service Division (CSD). CSD will be part of IBM's General Business Group.

CSD will be headquartered in Franklin Lakes, N.J., and will handle all GSD and OPD products, IBM said.

IBM charges for maintenance will not change, nor will the type of maintenance be altered as a result of the reorganization. A spokesman added the new division was formed so IBM could more cost-effectively handle maintenance and other customer engineering services.

IBM Vice-President Thomas M. Liptak has been named president of CSD. His former post was assistant group executive, management services, with the General Business Group. He will report to C.B. Rodgers Jr., vice-president and group executive for the General Business Group.



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USPS Figures on Nine-Digit Zip Disputed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Members of a House subcommittee recently charged the U.S. Postal Service (USPS) with trying to force nine-digit Zip Codes on the public without adequately assessing the costs to the Postal Service and to mailers.

"The record speaks for itself," Rep. Glenn English (D-Okla.) told a March 26 hearing on the Zip Code plan held by the House Government Information and Individual Rights Subcommittee. The panel has complained since last fall that the USPS could not demonstrate its planning is based on reliable cost and revenue projections.

English, chairman of the subcommittee, said "inadequate planning" by USPS has lengthened contracting for the equipment to read and sort letters bearing the new Zip Codes and delayed completion of the computer tapes of the new Zip Code data base businesses will use to convert their files to the longer numbers.

English also noted "the crucial discount incentive package" to spur business acceptance of the plan is not complete even though the new coding scheme is due for implementation June 1.

English announced the Office of Management and Budget will require USPS to conduct a new regulatory impact study to assess the effect of the "Zip-Plus-Four" plan.

Postmaster General William F. Bolger, in short-tempered testimony before the subcommittee, defended the Zip Code plan calling it almost a "'no-lose' proposition." He said the longer codes, "if used to process only first-class business letter mail, will return savings of $600 million a year upon completion of the system." Savings to the labor-intensive USPS could eventually reach $1 billion annually, Bolger said.

Several subcommittee members, however, expressed concern that the USPS figures are overly optimistic and grilled Bolger on how the calculations were done. English said USPS projections on previous postal operations gave him little reason to have faith in the Zip Code estimates.

English said he worries that if the figures are incorrect, "once the business community in this country is committed to the nine-digit Zip and once it is implemented it's going to be too late."

Clearly exasperated, Bolger insisted "we have estimated these things on a very conservative basis." He also defended USPS against charges the Zip Code project was sprung on Congress and the Postal Service Board of Governors long after the service had committed itself to the plan.

"We have been talking about this since 1976," Bolger said of the plan, noting it has been mentioned in USPS' annual report to Congress for the last three years. "It has not been a secret."

Bolger also received considerable criticism from Rep. Ted Weiss (D-N.Y.), who said "ad hoc planning" by USPS has dragged out the process of procuring the optical character and bar code reading equipment to sort mail with the longer codes.

Noting the procurement has been delayed and the contract documents amended several times, Weiss told Bolger "you're sort of making this up as you go along."

Bolger claimed the amendments were necessary for the sake of the bidders and not because of USPS ineptitude. He also explained there have been delays because USPS decided to buy only equipment made in the U.S.

"The planning wasn't incomplete," Bolger said. "We had some glitches that entered into it and that's not unusual in the government."

BASF Hikes Tape Prices

BEDFORD, Mass. — Citing rising costs of labor and raw materials, BASF Systems Corp. has raised the prices on its computer tape products from 10% to 18%.

Effective since Jan. 20, the new price structure includes BASF's Endura magnetic and 2000 A.D. premium-grade computer tapes. Reseller shipments began to reflect the higher prices last week.

Besides magnetic tape, BASF manufactures disk cartridges and packs, data modules, floppy disks, and digital and dictating cassettes. The company also makes 8-in. fixed disk drives and minifloppy disk drives.

None of the firm's other products were affected by the recent price boost, a spokeswoman stated from BASF, Crosby Drive, Bedford, Mass. 01730.

Cullinane Database Systems, Inc.,
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has joined the company
as Vice President

Charlie Bachman, previously Chief Staff Engineer at Honeywell Information Systems, Inc., is the recipient of the Alan M. Turing Award for his pioneering work in database systems. He is also a Distinguished Fellow of the British Computer Society, former chairman of the ANSI Distribution System Study Group, chairman of the ISO subcommittee on Open Systems Interconnection, and holder of numerous patents in the field of database management systems. Mr. Bachman is the creator of the graphic technique now known as the Bachman diagrams.

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Bell Seeks Commercial Transmission via Comstar

By Bruce Hoard
CW Staff

WASHINGTON, D.C. — AT&T recently requested federal permission to transmit high-speed commercial data for the first time via its domestic, Comstar satellites. If Bell is given the green light, its first customer will be the Chicago-based printing firm, R.R. Donnelley & Sons Co.

The common carrier's first commercial foray into satellite transmission of data is not necessarily a prototype for future applications, a spokesman said. Nor is it likely to be the precursor of a powerful penetration into the satellite data market, now largely controlled by Western Union and RCA, an industry expert said.

Bell was excluded from the market between 1976, when it launched the first of its four Comstar satellites, and 1979, when the three-year moratorium imposed by the Federal Communications Commission (FCC) was lifted. During that time, the satellites were used primarily for message telecommunications service (MTS), or long-distance telephone calls.

Earth Stations

Since the moratorium was lifted in July 1979, the company has been researching new uses for its satellites. It has filed a trial tariff that would permit it to transmit commercial television signals for the National Broadcasting Co. (NBC). It also asked for permission to build earth stations which would become part of a national teleconferencing network.

Earth stations for the 1.3M-bit/sec network will be located in Coram, N.Y., Lancaster, Pa., and Warsaw, Ind. Bell has asked for permission to build in Lancaster and Coram; the United Telephone Co. of Indiana will construct the Warsaw station.

Digital data from the earth stations will be shuttled to Donnelley over 1.5M-bit/sec capacity T-1 carrier lines. At any given time, each earth station will be able to simultaneously transmit data to the other two; an AT&T spokesman said.

In a press release issued by its Long Lines Department recently, Bell indicated Donnelley would use the service to "provide high-speed distribution of copy and data used in its printing operation."

A Donnelley spokesman refused to elaborate, saying, "Our people are not in a position to address those questions."

Asked about the satellite propagation delays Bell has been warning some of its low-speed data customers about, John Hayes, AT&T staff manager, High Capacity Channel, said the simplex nature of the Donnelley application would preclude any such problems.

The AT&T spokesman denied that the application is being viewed as a prototype, but said future high-speed commercial links could be patterned after it.

John Gantz, director of Publications at International Data Corp. (IDC), was not impressed by the common carrier's move.

"I don't think it's that big a deal," he commented. "The industry has known that AT&T was going to be allowed to do this since the mid-seventies and it's just taken them until now to do it."

Although Western Union and RCA do not have access to the high-speed T-1 carrier lines Bell will offer Donnelley, Gantz predicted the two would continue to control the domestic satellite data transmission market, despite the lower costs of the high-speed transmission.

Reagan Eyeing Communications

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration realizes the U.S. telecommunications industry can significantly reduce the nation's mounting foreign trade deficit and is exploring how to utilize the industry's capabilities, according to William Edgar of the State Department's Economic Bureau.

In a talk to a recent workshop here, sponsored by George Washington University, Edgar reported that legislation permitting establishment of export trading companies was recently introduced in Congress, with administration backing.

The White House, he added, is also considering reallocation of export-import bank loan funds; it might increase the financial aid provided to foreign purchasers of U.S. telecommunications, computer and other high-technology products. Another option under consideration would remove export "disincentives" by recommending changes in the Corrupt Practices Act and "clarification" of the antitrust statutes, Edgar said.

David Aylward, chief counsel and staff director of the House communications subcommittee, told seminar attendees that "we will continue to go in circles until we see some sort of consensus on a communications bill."

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I S C

Managers Taking Second Look At CAD/CAM

(Continued from Page 1)

impossible to do without the assistance of computers. These applications include not only complex circuit mask generation, but extend into intricate tool and die designs, Detroit's automobile empire and even into the construction of soaring skyscrapers.

Product Spotlight

"Kids coming out of high school can start work in a janitorial company and make more money than an experienced marker maker or tool and die craftsman," Ken Anderson, a computer graphics consultant who closely follows the CAD/CAM field, said.

"These people were experts who took 20 years to be good at a certain skill. But, they didn't make much money, so no young people are coming into those areas."

Together with his wife, Anderson publishes a monthly newsletter on computer graphics that focuses on the industry, its developments and new applications. Called "The Anderson Report," the nearly three-year old newsletter also leans heavily on covering breaking developments in CAD/CAM. In fact, the publication recently ran an extensive profile on Computervision Corp. in Burlington, Mass., a major producer of turnkey CAD/CAM systems.

Anderson was also the founder and president of Vector General, Inc., a $10 million privately held computer graphics company based in Woodland Hills, Calif.

Strong Forces

Basically, he believes that while the shortage of trained people in the designing arena has been a dominant factor in the rise of CAD/CAM, there are other equally strong forces at work.

"Product lives are shorter, so people are forced to come out with new designs more frequently," he explained. However, despite the quickened product development pace, there is a continued emphasis on final product quality. So, preproduction analysis and testing, while difficult for the harried designer, are still important issues.

"It turns out that with computer graphics and CAD/CAM capabilities, the designer can iterate through his design many more times before he finally turns in a production item," Anderson said. As a result, productivity usually increases by a factor of three-to-one, depending on the exact user function and application.

Return on Investment

Dr. Harry M. Taxin, vice-president of marketing for Gerber Systems Technology, Inc., agrees with Anderson, adding that as minicomputer and applications software prices decline more and more people will

(Continued on Page 19)

	Applicon, Inc.	Auto-Tol Technology Corp.	Calma Corp.	Computervision Corp.	Gerber Systems Technology Co.
System	Application Graphics System (AGS)	AD/380	DDM (For design drafting and manufacturing), Chips (for integrated circuit and VLSI design), Cards (for printed circuit boards)	Designer V	IDS-80
Applications	Mechanical engineering and manufacturing, architectural design, printed circuit board design, integrated circuit design, mechanical design	Manufacturing and mechanical design, architectural engineering, petrochemical industry applications, facilities management and space planning	Mechanical design, finite element analysis, parts nesting, printed circuit board design, wiring and piping design	Mechanical design and drafting, printed circuit design, integrated circuit design, cartography, piping design and analysis, structural design and analysis, wiring diagrams	Geometric modeling, detailed drafting, engineering analysis, finite element modeling, printed circuit board and schematic design
CPU	DEC PDP-11/34 or Applicon Graphics 32 (32-bit) processor	Univac V77-600, V77-800; DEC VAX-11/780	DG Eclipse S230	Computervision's CGP-200, Functionally distributed processor	HP 1000F Series
Maximum Memory	208K bytes (PDP-11/34); 64K bytes (Graphics 32)	2M bytes (Univac); 8M bytes (VAX-11/780)	512K bytes	Not Available	2M bytes
Graphics Display	Up to four raster-scan terminals; terminal keyboard and electronics made by Applicon	CC-80 (Auto-Trol) graphics workstation; storage refresh design with 19-in. or 25-in. screens; features graphics-only and alphanumerics-only screen commands to separate displays	Up to six high-resolution CRT terminals (primarily supplied by Mitsubishi Electric)	Raster-scan, up to eight Instaview terminals (manufactured by Computervision)	Tektronix storage graphics CRT with custom-designed keyboard (number depends on network configuration)
Color Capability	Yes, up to eight	No	Up to 16 at one time; colors are user-defined	Yes, up to 64	No, but will have that capability in about 12 mo
Digitizer	Standard small tablet, optional large tablet	Optic, Inc. digitizers (various sizes)	Calma large-scale three-cursor model for drafting; Computec and Talos tablets for smaller jobs	CVO digitizer with 36-in. by 48-in. active area; can interface with system or workstation	Summagraphics Corp. digitizer, tablet; Gerber symbolic data entry (Symde) tablet
Plotter(s)	Versatec, Inc. electrostatic plotter/printer, belt-driven flat-bed plotter	Four-color flat-bed (Mark 4-P), belt-bed and electrostatic printer/plotter; drawing sizes up to 4D or 2E	Calcomp, Xynetics, Inc. and Versatec electrostatic and pen plotters	Compucircuit 150 photoplotter for printed circuits, Interact IV four-color plotter/digitizer, Versatec printer/plotter, Calcomp pen plotter	Uses "full range of available plotters," including Versatec electrostatic, Calcomp pen and Gerber Model 75 flat-bed plotters; Gerber model accommodates sizes up to 6 ft by 24 ft
Printer(s)	Decwriter 30 char./sec line printer	200 line/min line printer	Printronix, Inc. P-300 300 line/min and P-600 600 line/min printers	Thermal matrix and 300 line/min high-speed printer (optional)	HP Model 2631 and Centronics line printers and Florida Data Corp. Model 600A, 600- and 900 char./sec printers
Disk Storage	DEC 200M-byte disk units (up to four drives); Memorex Corp. Model 677 disk drives	Control Data Corp. 9.36M-byte disk	CDC 80M- and 300M-byte drives, up to four units with each processor	Up to four 150M-word drives, also available in 40M-word disk drive versions	Up to four HP or CDC drives, with maximum storage of 1.2M bytes
Tape Drive	Digidata Model 1740 magnetic tape units (up to three)	Perkin-Elmer Corp. 800- and 1,600 bit/in. tape units	Wangco and Cipher Data Products, Inc. 45- and 75 in./sec units	Up to two 800 bit/in. Magnetic tape drives	HP 7970B 800 bit/in. or 7970E 1,600 bit/in. tape drives
Perforated Tape I/O	Optional punch/reader for numerical control operations	75 char./sec punch, 300 char./sec reader	Remex punched tape readers and writers	Yes, for numerical control	Yes, for numerical control; can also accommodate Mylar tape
Communications Interface(s)	Decnet, IBM Hasp, emulators for 2780	Decnet, IBM Hasp, Univac	DG's synchronous interface; IBM Hasp, 2780, 3780; CDC UT-200 Hasp	Cunet (between similar processors); IBM 2780, 3270, Hasp; Univac J1004; CDC UT-200 Hasp; DEC 2780; Honeywell, Inc. GRTS	Gerber TSCC controller Models 1 and 2 supports most common protocols, including IBM
Programming Languages	Fortran IV Plus, Basic	Fortran, RPG-II, Cobol	Fortran V	Fortran, APL, Strudel and other industry-standard languages	Fortran, Basic, some machine language, User (a user programming module)
Price	$300,000-$325,000 for four-terminal system (depending on processor)	$150,000 (for small system with limited applications) and up	$200,000-$700,000	$300,000	$200,000 and up

CW Chart

Guidebook Offers Tips

Productivity Seen Issue in CAD/CAM Selection

By Tim Scannell
CW Staff

Whether it's measured by improved throughput or by one's ability to keep ahead of the competitive Joneses, productivity is the word users use when they're explaining why they want to buy a CAD/CAM system. But how does a company tackle the vendor lineup and select the right CAD/CAM route?

Years ago, selecting the right CAD/CAM system was relative child's play because there were only one or two crude systems to consider. But now, with the variety of available and complex systems, there is no longer such a thing as a simple selection process.

One way to start on the acquisitions journey is to make a complete list of each systems capabilities, according to *The CAD/CAM Handbook*, a guide released last year by Computervision Corp. This capabilities list would include hardware, software, system expandability, general support, installation, documentation and vendor experience. And each subcategory in the capabilities rundown could be assigned percentage weights that could be tallied for a final selection score, the guide continued.

Product Spotlight

For instance, on the hardware side, plotters could be given a maximum high score of 15%, while CRTs could be rated at a high of 30%. If any equipment falls below these top percentiles, it could be spotted and eliminated at a glance.

It might also be helpful to establish an evaluation team which would include representatives from various groups within the concerned organization.

A typical team might include people from: conceptual design, design engineering, detail design, manufacturing design, the procurement and the data processing departments, the guide noted.

That perennial bottom line, the total cost, would also be included in the potential user's buying checklist. Cost considerations would include all extras such as training, service, maintenance and documentation. If the system is to be leased, then the estimated life of the system should be considered, as well as one-time costs like communications lines and special hook-ups for laboratory equipment, the guide stated.

Finally, after selecting a "dream system," the user should insist on vendor-run benchmarks to determine system performance. Two kinds of benchmarks could be used: synthetic, containing programs with pre-established parameters that exercise a set of system resources; and live, which are drawn from the user's actual work load and are considered adequate models.

Computervision's 306-page CAD/CAM guide is available for $20 from the company at 201 Burlington Road, Bedford, Mass. 01730.

Managers Reconsidering CAD/CAM

(Continued from Page 18)

adopt the technology.

"The return on investment gets better every year," Taxin observed, "particularly as labor costs — which are typically used as a justification — keep going up."

While the threat of automation has ruffled more than a few workers' feathers and caused labor unions to go into fits of strike frenzy, CAD/CAM is usually considered to be a boon rather than a bust to a particular industry.

Part of the reason for this is that CAD/CAM systems now instantly perform excruciatingly complex tasks that might take a staff of design engineers months to complete. Another reason is that labor has had a lot of time to become acclimated to the technology and, because of its ability to increase productivity, recognize it as an aid rather than a hindrance to job security.

"Five or more years ago, there was a real concern for automation putting people out of work," Taxin explained. "Now I think we're past that point, even to the extent that some of the unions in Detroit are suggesting that more could be achieved for the worker by accepting the equipment."

If anything, the only worries that workers and upper management have about CAD/CAM now is if it can ever do as good a job as they did when they were "on the boards" many years ago, Gerber's vice-president said.

Some Problems

However, despite its being on the technology fast track and its rosy future, CAD/CAM does have its problems.

Since its birth some 15 or 20 years ago, hardware and software developers have mostly concentrated on the CAD portion of the technology and have only brushed the surface of CAM. In fact, vendors are only recently beginning to focus on bringing computer-assisted quality assurance and control — long a trademark of computer-aided design — to the manufacturing front, both Taxin and Anderson pointed out.

In addition, there are still a number of areas to be conquered in the design flexibility of CAD/CAM systems. "There are a lot of things that humans used to do which are not easy to do by computer," Taxin said. These include very complex surface modeling and handling solid three-dimensional objects that have been bisected and trisected into various coordinating cuts.

"Some surfaces were not ever meant to be represented by mathematical models because they were just free-form aesthetic-type surfaces," Taxin continued. The problem, then, is to improve CAD/CAM's mathematics that represent surfaces so that higher forms of surface contours can be modeled.

"At the same time, however, engineers must be brought to the point where they can deal with mathematics, as opposed to insisting on some free-form type of technology," Taxin stated.

	Intergraph Corp.	Redac Interactive Graphics, Inc.	Synercom Technology, Inc.
System	Intergraph System	The Mini and The Cadet	Infodraft
Applications	Primarily intended for mining and earth sciences areas	Printed circuit board design	Architectural engineering, store planning, mechanical design, structural design
CPU	DEC PDP-11/44, 11/70 (VAX-11/780 later this year)	DEC PDP-11/34	DEC PDP-11/70
Maximum Memory	11/44: 1M bytes; 11/70: 4M bytes	48K-64K bytes	2M bytes
Graphics Display	Manufactured by Intergraph; raster-scan monochrome or color display; system can handle up to 16 CRTs (although not recommended by the firm).	DEC VT-11 or VS-11 color CRT	Tektronix storage-tube-technology CRT
Color Capability	Yes, up to eight displayed at one time; user can define up to 256 colors	Yes, 16 primary colors	No
Digitizer	Altek Corp. small and large models; some digitizers manufactured by Intergraph	DEC light pen	Talos small and large table digitizers
Plotter(s)	Primarily Versatec electrostatic and Calcomp pen plotters	(Optional) Versatec electrostatic, Gerber, Tektronix, Calcomp	Calcomp 48-in. by 78-in. flat bed
Printer(s)	Dataproducts, up to 900 line/min capabilities	Decwriter II LA-36	Versatec electrostatic and Data Printer Corp. line printers
Disk Storage	CDC 80M- and 675M-byte drives; up to eight per system	RL01, two per system	CDC and DEC 80M- or 300M-byte drives; maximum of four
Tape Drive	Cipher 1,600 bit/in. drive	No	DEC 45 in./sec or 75 in./sec tape units
Perforated Tape I/O	No	DEC PC-11 paper tape reader/punch	Yes, for numerical control
Communications Interface	Decnet; IBM 2780, Hasp host interfaces	Decnet, IBM 2780, Hasp host interfaces	Decnet; IBM 2780, 3270, Hasp
Programming Languages	Any languages that function under DEC's standard RSX-11 operating system; however, most users rely on Fortran.		Fortran IV, Basic Cobol
Price	About $400,000	Under $50,000	$250,000 and up

CW Chart

Increasing Importance

Fortune 500 Exec Puts CAD/CAM on 'Hot' List

By Tim Scannell
CW Staff

NEW YORK — At an industry forecasting meeting held here recently for executives up and down the Fortune 500 ladder, one of the many speakers coolly put on his psychic hat and listed the upcoming years' 10 hottest computer growth areas.

Product Spotlight

Computer-aided design and computer-aided manufacturing (CAD/CAM) was mentioned last, right after personal computing. Although the speaker obviously didn't intend that the list's placement numbers be taken as an indication of each category's industrial importance, more than one Fortune 500 executive in the audience jumped on the speaker's supposed misconception.

While not a terribly "hot" topic on today's traditional business-oriented lecture circuit, CAD/CAM will probably be the "Big-Industry-On-Campus" in tomorrow's business world. In fact, CAD/CAM could prove to be just the shot-in-the-arm needed to bolster sagging U.S. productivity and increase international competitiveness, according to a recently completed Arthur D. Little, Inc. (ADL) Impact study on CAD/CAM.

What Next In CAD/CAM?

Computer-aided design and computer-aided manufacturing (CAD/CAM) has grown from its printed circuit board and integrated circuit beginnings to such seemingly unrelated applications as piping design and architectural layout.

However, the developmental question of the hour is: Where will CAD/CAM take firm root next and how much will the technology revolutionize that area?

If the present activities of graphics software vendors are any indication, CAD/CAM's next hot growth area will be in mechanical engineering and design. It is into that area that most vendors are now pouring most of their money on research and development, consultant Ken Anderson noted.

Dr. Harry M. Taxin of Gerber Technology Systems reiterated Anderson's observation, noting that rising interest in the mechanical design arena was probably spurred by the increasing saturation of numerically controlled (N/C) machines into the American work place.

"The growth of numerically controlled machines in American industry will lead directly to the requirement for CAD/CAM to produce tapes and other forms of control information to drive these machines," he said. "Electrical CAD/CAM was the first and by far the easiest 'new wave,' but there will be a much fuller expansion into the mechanical marketplace."

Authored by CAD/CAM experts Roy M. Salzman and Irvin Krause, the study relates that in addition to increasing labor productivity and enabling better communication between designing and manufacturing, the technology will improve the U.S. competitive posture because it decreases production costs. However, the initial capital investment required by a CAD/CAM system might take the breath away from even the most hardened corporate financial director, the report hints.

The Impact study goes on to predict that CAD-oriented techniques will continue to experience a rapid worldwide growth, averaging about 25% to 1984. And the market will expand from $590 million in 1979 to more than $2 billion in 1984. The U.S., which is the leader in CAD/CAM production and use now, will account for about 75% of this market total, the ADL study noted.

While a less definable market, the CAM market — which includes machine tools, numerical control systems, automated materials handling and, of course, robots — will steadily increase by about 10% through 1984. In fact, the greatest growth area in this particular automation niche will be in the numerical control systems market, which will increase from a record high of $5.5 billion in 1979 to a phenomenal $10.2 billion in 1984.

All of ADL's figures are based on 1979 dollars and do not reflect any extraordinary recessional or inflationary jumps, the report reminded.

As for who will dominate this rosy-pictured market, the leader today and most probably in the coming years will continue to be Computervision Corp., according to a five-year forecasting study of the U.S. computer graphics market released by International Data Corp. (IDC) in mid-1980. In 1979, Computervision was the market leader with a 33% share of the CAD/CAM market revenues and a 28% share of the units.

However, a number of companies are coming up fast on the inside track, including Applicon, Inc., the No. 2 company; Calma Corp.; and Lockheed/IBM, which basically manufactures CAD/CAM software that is run on IBM computer systems, the IDC report said.

The IDC report further predicts that the installed base of CAD/CAM systems will increase from about 2,200 systems at the end of 1979 to a staggering 15,000 by the end of 1984. And associated workstations will jump more than 600% from 7,500 in 1979 to a whopping 43,300 in 1984.

Finally, since software is obviously equally or more important to the user in the CAD/CAM game, the IDC report focused on why a particular company might purchase a graphics CAD or machine-controlling CAM software system. By large vote, ease of use was the overwhelming criteria, followed by speed, applicability to the work problem, reliability and device independence. Data base capability was listed as a last consideration among the companies polled in the IDC five-year study.

U.S. INSTALLED BASE OF CAD/CAM SYSTEMS AND STATIONS

YEAR	SYSTEMS	STATIONS	STATION GROWTH
1979	2,200	7,150	
1980	3,180	9,870	38%
1981	4,700	14,000	42%
1982	7,040	20,400	46%
1983	10,600	30,150	48%
1984	15,500	43,300	44%

International Data Corp. Figures

U.S. CAD/CAM MARKET
(U.S. Shipments of U.S. Manufacturers)

SUPPLIER	INSTALLED BASE AS OF 12/79	1979 SHIPMENTS: Units	Revenues ($ million)	SHARE OF REVENUES
Computervision	460	138	$54.0	26%
Applicon	555	108	34.0	16%
Auto-trol	210	75	25.1	12%
Calma	300	65	24.0	11%
M & S	175	39	17.7	8%
Redac	225	75	16.0	8%
Lockheed/IBM[1]	53	28	14.0	7%
Gerber	125	40	12.0	6%
Synercom	40	14	5.6	3%
Summagraphics	48	48	2.4	1%
Calcomp	9	9	2.3	1%
OTHER:				2%
Nicolet Zeta	5	5	1.5	
National Computer	2	2	1.5	
Information Display	35	10	1.1	
Data Technology	1	1	0.1	
TOTAL	**2,243**	**657**	**$211.3**	

1. Excludes the value of host computers

International Data Corp. Figures

CAD/CAM SHIPMENT FORECAST
(Worldwide Shipments of U.S. Manufacturers)
(Revenues in $ Million)

SYSTEM TYPE	1979	1980	1981	1982	1983	1984
GENERAL PURPOSE						
Systems	875	1,270	1,800	2,600	3,800	5,000
Stations	2,840	4,300	6,320	9,300	14,120	19,500
Revenues	$312	$430	$600	$840	$1,130	$1,460
SPECIAL PURPOSE						
Systems	97	275	600	1,270	2,250	3,880
Stations	110	330	790	1,650	3,400	5,620
Revenues	$20	$50	$95	$160	$240	$365
TOTAL SHIPMENTS						
Systems	972	1,545	2,400	3,870	6,050	8,880
Stations	2,950	4,630	7,110	10,950	17,520	25,120
Revenues	$332	$480	$695	$1,000	$1,370	$1,825
GROWTH		**44.6%**	**44.8%**	**43.9%**	**37.0%**	**33.2%**

International Data Corp. Figures

Costing Taxpayers Millions

Committee Finds 'Imbroglio' in Bay State DP

By Bill Laberis
CW Staff

BOSTON — An "imbroglio" is the way DP operations in the state of Massachusetts have been described in a report made public by the governor's Advisory Committee on Computers and Data Processing.

The committee of private and public-sector management executives was formed five years ago to examine the state's DP system. At that time, the system was found to be wandering unplanned, aimless and out of control.

The committee's latest report cited some improvement in the situation, but concluded that DP operations are still very much mired in the political and economic realities of the area.

For example, included in the state's $125 million DP budget today are the salaries of janitors, truck drivers and storekeepers who have been listed as programmers, data entry clerks and systems analysts, the committee found.

State of Taxachussetts

Several top DP managers working for the state are paid a fraction of what their counterparts in private industry earn, an inequity that has fueled a steady migration of qualified DPers from the state operations into private business and industry.

These and other aspects of the state's DP operations may well be costing taxpayers millions in foregone tax collections and inefficient services, all at a time when the state is struggling to shed the label "Taxachusetts."

"Needless to say, it's going to take more than a small effort to straighten things out," lamented Melvyn Galin, committee member and Mitre Corp. executive. "We're dealing with a DP dilemma that has evolved and endured over a long period of time."

In its recently submitted report, the committee urged the state to adopt five principal recommendations to address its computer problems. Included among them was the appointment of 12 DP executives to a full-time action team to further study the computer management problem.

However, the road to healthy management and operations is fraught with several obstacles.

More Money

For one thing, the committee reported that rectifying the DP mess is going to take more money — about $19 million more. Unfortunately, requests now for the sorely needed funding to upgrade DP salaries coincide with the firing of literally thousands of policemen, firemen and municipal workers across the state as a result of recent tax-cutting legislation.

Furthermore, the demand for programmers, systems analysts and operations managers is perhaps more acute in eastern Massachusetts than anywhere else, due to the heavy concentration of computer manufacturing, financial and insurance firms here, Galin said.

Because of its limited resources and rigid wage structure, state government salaries have not kept pace with those in industry. And with companies begging for qualified help, state DPers are easily lured away to the higher pay scales and generally better career opportunities.

To make a bad situation worse, voters here last November overwhelmingly passed Proposition 2½, a radical tax-slashing referendum designed to reduce an oppressive property tax burden. At the same time, voters stripped the legislature of the fat pay raises it had voted itself in the wee hours of Halloween, away from the watchful eyes of the press.

But in removing those raises, voters also axed the raises of many DP managers and systems analysts, chopping their salaries down to the pay levels of some advanced programmers in private industry, Galin explained.

"Understand that many of the state's DP personnel are covered by union contract," Galin said. "The unions will be loathe to allow significant pay increases for DP workers, while salaries for the rest of its membership remain the same. People just don't picket the state house for better management and efficiency in operations."

Further muddying the computer picture is the state's negligence in establishing standard, industrywide job descriptions and classifications, as the business world has done for years with its DP operations.

"The personnel and hiring system within the state is a poor one, and that's being kind," Galin said. "The legislature issues schedules of job titles for each person employed by the state. These schedules don't easily change, even as personnel needs change."

Meanwhile the state has upgraded its hardware over the last three years, "so that it now has the best equipment available for the job," Galin reported.

"If only it were just a question of hardware," he said.

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Set-up Modes Eliminate External Switches	STD	NO	STD	NO	NO	NO
Typomatic Solid State Keyboard	STD	NO	NO	NO	STD	NO
Detached Keyboard	STD	STD	OPT	NO	STD	STD
CRT Saver	STD	NO	NO	NO	NO	NO
Block or Underline Cursor	STD	NO	STD	STD	STD	NO
80 and 132 Columns	STD	NO	NO	NO	OPT	NO
Double Size Characters	STD	NO	NO	NO	OPT	NO
Smooth Scrolling	STD	NO	NO	NO	OPT	NO
Horizontal Split Screen	STD	NO	NO	NO	STD	NO
Video Attributes Require No Display Space	STD	NO	NO	NO	STD	STD
8 Area Qualifications	STD	NO	NO	NO	NO	NO
8 Resident Nat'l Char. Sets Including Line Drawing	STD	NO	NO	NO	NO	NO
Programmable Non-volatile Function Keys	STD	OPT	STD	NO	NO	NO
Display of ALL Control Codes	STD	STD	STD	STD	NO	STD
Insert Delete Line with Push Up or Down	STD	NO	NO	NO	NO	NO
Insert Delete Character with Push Right or Left	STD	NO	NO	NO	NO	NO
Select Editing Extent to Field, Area, Line, Page	STD	NO	NO	NO	NO	NO
20 mA Current Loop	STD	STD	OPT	OPT	OPT	STD
Programmable Message Framing (non-volatile)	STD	NO	STD	NO	NO	NO
Programmable Answerback	STD	NO	STD	NO	NO	NO
Baud Rates to 19200 BPS	STD	NO	NO	NO	STD	STD
Independent Xmit/Receive Rates	STD	NO	NO	NO	NO	NO
Printer Port Independent of Communication Interface	OPT	OPT	STD	STD	OPT	STD
Paging	OPT	STD	NO	NO	STD	STD

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'Better Late Than Never' for Mass. Systems

By Bill Laberis
CW Staff

BOSTON — "Well, I guess it's better late than never, but I really had no idea we were that late."

This is the way Massachusetts Gov. Edward King reacted to the news that the state finally has an on-line, real-time Criminal Justice Information System (Cjis) up and running — the 50th state to do so.

The new system, part of an ongoing massive overhaul of the state's ailing DP operations, will now allow law officers across the state to gain immediate access to an expansive crime data base maintained by the state Department of Public Safety. The heart of the system itself will be linked to the federal Justice Department's National Crime Information Center computers in Washington, D.C., as well as to Cjis systems in the other states.

The system will store information on wanted and missing persons, stolen property and stolen cars — all updated continually by local and state police and county sheriffs' offices via remote terminals over shared communications lines.

Jail Use

The data base will also be used by the wardens and guards in the state's jails to assist with prisoner management and daily protocol within prison walls.

"It's the kind of system that will make police business a lot more efficient in general, and a lot safer for the guys on the street," said Louis H. Sakin, executive director of the Criminal History Systems Board. "And it is really like an electronic mail system — a time-tested electronic mail system."

Without the system, a cop must rely on the antiquated "hot sheets,"or long and only partially updated typed lists of stolen goods and wanted persons.

It is going to be a great boost to the crime-fighting effort in the state, Sakin said. "That is one reason why the governor placed the development of the system at the top of his list of priorities when he took office two years ago."

But there was another reason for the governor's haste. The Law Enforcement Assistance Association (LEAA), the federal agency that funded the lion's share of project implementation costs, was threatening not only to cease funding the system, but also to call back the money it had previously awarded the state for it. In fact, LEAA was holding on to some $1.9 million in funding pending the recent successful completion of the state's Cjis.

Seven-Year Debate

According to one member of the governor's cabinet, the extensive delays in setting up the system were punctuated be a seven-year debate over just who would oversee the operation and insure the rights of privacy of individuals with criminal information inside the data base. A nationwide search for such a management information systems (MIS) chief turned up Louis Sakin.

At present, there are 300 legal jurisdictions serving 16,000 law officers across the state that are linked to the Cjis, Sakin said. The annual cost for terminal and communications line rental is about $4,200 per terminal, putting the system well within the financial grasp of most of the state's 351 communities.

The software design for the system was handled by the state's own DP personnel assisted by personnel from Burroughs Corp. The host mainframes for the data base are twin Burroughs 6700 CPUs, Sakin said.

NBS Releases Documentation Guide

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has issued the *Computer Model Documentation Guide* to assist managers, users, analysts and programmers in the documentation process. The publication includes separate guidelines for preparing a management summary manual, a programmer's manual and an analyst's manual.

The publication was prepared for the NBS Institute for Computer Sciences and Technology by the Federal Computer Performance Evaluation and Simulation Center (Fedsim). After reviews and trial use, the document will be reissued as a federal guideline in the Federal Information Processing Standards series.

The guide, Stock No. 003-003-022829, is available for $3.75 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

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Backlog Totals $30 Million

Hub's Police Ticket, But Collection System Stalls

By Bill Laberis
CW Staff

BOSTON — The City of Boston, facing the tightest fiscal squeeze in its 350-year history, is losing millions of dollars to an outdated computerized collection system that has not processed a parking ticket in 14 months.

In fact, municipal court officials have received payment on 300,000 tickets in the last year, but have not been able to match the payee with a citation because ticket information has not yet been entered in the city's off-line system.

In all, there are about 3.5 million outstanding traffic tickets totaling more than $30 million, and constables are doling out another 100,000 tickets each month.

"The truth is that we'll probably never collect more than half of that $30 million because some of those tickets date back to 1973," said Eugene Levine, executive secretary of the Boston Municipal Court. "But we have a huge problem here because this city is in desperate financial straits and we have to get some money moving."

At the heart of Boston's DP collection dilemma is a second-generation Sperry Univac 9200 CPU and an array of keypunch, key-to-disk and disk-to-tape machines, all of which are drastically inadequate to handle the present ticket volume. Summonses and other ticket information are printed on one 200 line/min printer.

A similarly inadequate data base at city hall cannot be accessed remotely. Half of the 35-person collection staff are now performing strictly clerical, non-DP functions, including the shuttling of disks, tapes and cards between the Old Court House and City Hall.

"The [Univac] 9200 was fine in its day, but it is amazing how quickly our equipment became outdated, given what it costs," Levine said. "We've had it maybe 13 years, and for the last few it has been quite inadequate. We have no random-access capabilities. It does only one thing at a time, and not very rapidly at that."

The system and ticket logjam has all but canceled the city's formerly touted Denver Boot program designed in the '70s to force chronic parking offenders to pay up.

Parking constables armed with lists of drivers with five or more outstanding citations would slap the bright yellow "boot locks" around the front tires of an offender's car, creating a pay-or-lose-your-car situation. Shortly after the program began, the boots were as pervasive as double-parked cars, but because of the DP-instigated backlog, it has now become impossible for officials to generate current tow-hold lists to support the program.

"We could end up booting and towing a car whose owner just paid his back fines," Levine said. "We just don't have any current records matching payments with tickets."

The city has taken the first step in correcting its ticket system by soliciting requests for proposals from service bureaus and systems houses. The idea in the short term is to pay a private DP contractor to clean up the ticket backlog and bring the system up to date.

Levine said he expects some extra help from court prosecutors in the form of "a mass infusion of personnel to help us collect back fines."

The long-term solution is less clear, but appears to involve the purchase or lease of state-of-the-art hardware to build an on-line, remote entry distributed data processing system "using a large accessible data base to process ticket information quickly," Levine said.

Will the long-term costs be justified by increased fine collections?

"Oh boy, would they ever," Levine said.

Industry Seeks Day in Court

NEWARK, N.J. — Another battle in the war between AT&T and the computer industry began here recently when three industry trade associations asked the U.S. District Court in Newark to let them intervene in an upcoming hearing on the phone company's 1956 consent decree.

The hearing grows out of a petition AT&T filed earlier this month [CW, March 16]. The court was asked to rule that the phone company can market on-line information services and terminal equipment on a deregulated basis without violating the consent decree.

This is the position taken by the Federal Communications Commission (FCC) in its Second Computer Inquiry Decision, issued last December. The computer industry, with others including the Justice Department, opposes the commission's conclusion.

The Newark court has jurisdiction over the question because it presided over the negotiations between AT&T and the government which led to signing of the decree.

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By Rita Shoor
CW Staff

TRABUCO CANYON, Calif. — Computer graphics may be new to big business conference rooms, but it provides familiar tools for Dr. Gideon Ariel, head of the Coto Research Center (CRC) and biomechanics specialist-at-large.

Biomechanics is the science that involves the study of motion in humans and other living organisms. Combining biomechanics with computer technology has resulted in sports science and made CRC a mecca for professional athletes who want to set new records.

Graphics systems from Megatek Corp. are just one of the components used by Ariel and his small staff in the sports science arena. "We have eight Data General Corp. computers for just seven people," Ariel said. Besides the DG Novas and the graphics terminals, the CRC staff develops specialized software to analyze the crucial elements that make a particular physical endeavor as "close to perfect as possible."

The initial phase of the process begins with slow-motion cinematography of the athlete as he performs his specialty, Ariel explained. Each frame is then digitized with the coordinates of each joint visually registered on a CRT terminal as they are

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input to the DG minis. This results in a continuous series of stick figures that represent the actual position of the body and its limbs during each critical phase of action.

CRC programs analyze the data and generate a report that compares the subject's performance to the "theoretically perfect" way to perform the specific endeavor, the scientist said. The same printout includes pointers indicating exactly how and where the subject should modify and improve his technique in order to achieve individual optimum performance, Ariel said.

World-Record Difference

The current chairman of the computer science/biomechanics committee for the U.S. Olympic sports medicine committee then demonstrated how the system worked for track stars like Evelyn Ashford.

As the athlete ran around the CRC track, her movements were transmitted to the system through several strategically placed force plates. Analysis of Ashford's exact foot placement indicated that she was turning her right foot very slightly inward as she ran — so slightly that it was completely undetectable to the naked eye.

Correcting this tendency could result in the athlete cutting as much as a tenth of a second from her time. In Ashford's case, "that could mean a world record," Ariel maintained.

The tailored software required for CRC's specialized applications is generated through the combined efforts of the California staff and Computerized Biomedical Analysis, Inc. (CBA) in Amherst, Mass. CBA owns 50% of the research center and essentially functions as a behind-the-scenes development facility.

Both groups of scientists utilize Megatek 6000 and 7000 series graphics systems to portray the stick-figure athletes. With three-dimensional capabilities, the terminals make it possible for the observer to see a championship golf drive, tennis swing or marathon pace — a la Jack Nicklaus, Jimmy Connors or Bill Rodgers — from different directions.

Although color graphics is not as important as accurate measurement for most sports science applications, Ariel indicated that CRC would eventually implement color graphics on all of its systems.

Pinpoint Weaknesses

Ariel has already done it on a sort of computerized exercise machine dubbed the Ariel 2000. Combining multifunction exercises designed to concentrate on specific muscles with specialized software operating on the DG minis, the computer supplies the athlete with the most appropriate exercise routine geared to produce maximum results for a particluar part of the body.

The person working out receives immediate feedback via a color graphics (CRT) terminal mounted above the exerciser (see related photos) and can selectively exercise the muscles that need the most work. Ariel recently sold the entire package to Wilson Sporting Goods for commercial distribution and is already involved in developing a prototype for home use by the family that wants to stay in shape.

The installation of new equipment probably will not change Ariel's unorthodox approach to computer maintenance contracts — an approach that consists of ignoring their existence. "If you have a[n equipment] maintenance contract, things go wrong with the equipment," he maintained.

His opinion appears to be justified since the only service required on the Megatek systems in some five years was the installation of transformers at the California facility. And these were traceable to power surges in the lines running out to the remote CRC location rather than to any breakdown in the systems themselves, he said.

Ariel made the cross-country move to California's warm climate because "we needed a location where we could bring athletes in the winter. Coto de Caza [the resort community housing CRC] is an unbelievable place from a location point of view," he maintained. Not entirely incidentally, he also wound up with a "good deal" from Arvida Corp., the real estate development firm for Coto de Caza.

The doctor's practical approach is also demonstrated by the decision to keep his "think tank" in Massachusetts when he moved west in late 1980. CRC has "a few geniuses out East and we don't want the big corporations to see them . . . so we keep them in the woods somewhere," Ariel noted as he carefully refrained from giving out a specific address.

Most of the California staff members also maintain a low profile, apparently by choice. Dr. M. Ann Penny, who handled the graphics system keyboard, was the only other CRC employee present.

Functioning as coordinator of all incoming research projects, Penny supervises and conducts the entire digitizing process — from initial analysis to the final result accumulation. Preferring to be at the computer and out of the spotlight, she likened herself to a digital computer and Ariel to an analog machine. Ariel put it another way — "I'm the mouth and she's the brain."

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Bechtel Exec Describes Way Out of 'Data Maze'

By Lois Paul
CW Staff

AUSTIN, Texas — The data management administration group at Bechtel Power Corp. has found a way out of what it calls "the data maze."

Russ Bond of Bechtel told members of the Association of System 2000 Users for Technical Exchange (Astute) here recently that Bechtel is using a data base management system (DBMS) to create a single large data base which is considered the "best source" of reference data in the company.

The data base administration (DBA) group is located within the DP department of Bechtel, an engineering and construction management company which has handled projects such as the Hoover Dam in Nevada and the San Francisco-Oakland Bay Bridge, Bond explained.

Essentially intended to provide technical support and data base consulting services to users of Intel Corp.'s System 2000 within the company, Bond's group took its first step toward designing the new system one and a half years ago by redefining its function as users of the DBMS tool who have the responsibility for setting up services which make a shared data environment possible.

Bond described the data maze as the relationship between categories of data and their categories of influence. Within Bechtel, he said, the two categories of data are corporate reference and application, with reference strongly influencing application or activity data. "Understanding these relationships and their potential value is what I call the data maze," he said.

The DBA group at Bechtel used System 2000 to develop a system that would eliminate redundant sources of reference data and achieve a much higher level of data integrity, he explained. The group designed and created a singie data base that captures reference data from its best source. Services are then offered by the DBA group to automate the distribution, transportation and maintenance of reference data.

Some of the services added include standard reports, customized reporting, customized data files, application program Plex access and System 2000 application data base report writer extensions. All the latest corporate reference data is made available immediately to applications and business activities throughout Bechtel.

Bechtel's physical data base schema is named Gendat (Generic Data Base) and has a versatile physical design that can be used to take on many logical structures. All updating of reference data takes place within this centralized file.

Data Dictionary

The DBA group added a data dictionary to its Gendat maintenance effort, which includes table validation, output maintenance, Plex access and impact reporting.

The data integrity for those applications that use Gendat and DBA services is assured with a minimum of interruption. Bond said System 2000 DBMS facilities have been a key factor in offering these new services.

However, he said, three features would improve System 2000. They are the addition of a relational join capability to its report writer and query facility; the ability for users of Sperry Univac hardware to implement an online forms-driven front end, such as Quex, which runs on IBM equipment; and a back-end machine that would resolve Bechtel's data transportation problems between its varying hardware types.

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Automation Said Creating Information Culture

By Ann Dooley
CW Staff

HOUSTON — Computer automation is moving us out of the post industrial era and propelling us into an information culture before many of us are really ready for it, according to Paul Strassmann, vice-president for planning, information products group, at Xerox Corp.

Speaking at the American Federation of Information Processing Societies (Afips) Office Automation Conference (OAC) here recently, Strassmann noted that most people's frame of reference is still with the older era, which maintains that machines program the worker.

"We are just beginning to coordinate the vast amounts of information that are waiting to be utilized," he said. As businesses all over the country begin to implement office automation systems, users will begin leading the way themselves, experimenting with new uses as they learn how to use information to fit their needs, Strassmann noted.

Problems can arise, however, Strassmann warned. Comparing office automation to guerrilla warfare, he told the conference attendees that installations should not be overplanned. Line management must be intimately involved and be flexible enough to respond to the change in office needs, he said.

In examining the changing nature of work, Strassmann noted that industrial culture consists of simple, standardized jobs with common skills that are socially unrelated and with a finite scope.

In the information culture, on the other hand, jobs demand individual competence, give a sense of task completion and provide an opportunity for learning and change.

Appreciating Assets

Where once products were costly to replicate and would depreciate with use, the information era will provide cheaper replication advantages and assets will appreciate with use. Instead of singular ownership and diminishing value when a product is divided, multiple ownership will be common and the multiple use will appreciate assets, he said.

On the flip side of the coin, Strassmann noted that in the product-oriented culture, assets could be identified and protected, while in the information era, property will be hard to protect and theft will be difficult to prove.

Additionally, values will no longer be so straightforward. The value of knowledge is unpredictable and total costs are hard to isolate, Strassmann said.

What is more, as automation continues to accelerate, it becomes more apparent that adequate measures for measuring productivity do not exist, Strassmann contended. Measuring output by input to obtain productivity is embedded in the culture, but only a small portion of white-collar transactions can be measured this way, he said. Instead of being programmed by the machine, Strassmann believes the machine will finally be used as a tool in the new information era.

Large bureaucracies, for instance, will not be able to justify large-scale investments of capital, since their inherent structure impedes measurement, according to Strassmann. Sectors of the economy such as consulting services, newspapers, computers and entertainment, which sell their products to the mass market, will increase their automated information usage; but areas like education, government and corporate administrations, with the end product as overhead, will not, according to Strassmann.

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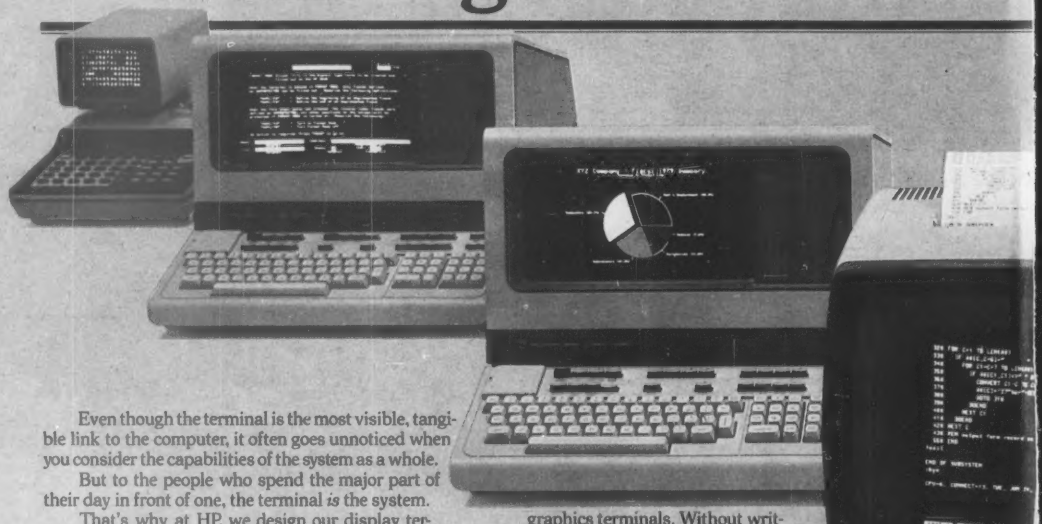

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Health Hazards or Jobs?

'Real Issues' of Office Automation Disputed

By Ann Dooley
CW Staff

HOUSTON — "Health and safety issues are a smokescreen. The real issue is jobs," computer consultant Philip Dorn proclaimed at the recent Office Automation Conference here. The social impact and ergonomic issues of automating the office were hotly debated throughout a number of conference sessions.

Job displacement, the declining quality of jobs and employee health were topics which played a major part in the three-day conference and attracted the varying opinions of consultants, users, managers and academicians.

In a session billed as "The Great Debate" chaired by Amy Wohl, the audience appeared to be divided along feminist lines as well as office automation viewpoints.

Judith Gregory, research director for Working Women, a national association of office workers, maintained that while automating the office can prove worthwhile, many of the clerical workers are being deskilled and being made to feel merely extensions of their machines.

Jobs are increasingly being made more routine, are being paced by the computer and are monitored by the dehumanizing factor of number of keystrokes per hour, she stated.

The proponents of office automation contended that the crucial question is whether jobs aid in productivity. If they don't, they should be eliminated, according to Walter Ulrich, a Houston computer consultant.

Dale Kutnick, vice-president of The Yankee Group, agreed, contending that automation increases the flexibility of office jobs.

But others on the panel took issue with this view. Ted Sterling, professor at Simon Fraser University in British Columbia, believes office workers will become increasingly unhappy about their working conditions.

Technology is supposed to make a better life for people, but it doesn't, he asserted, noting that evidence of increased stress and chemical hazards are becoming more commonplace.

This was a frequent complaint heard throughout many of the sessions. While office automation may increase productivity and therefore the business, how much does it help the individual employees?

Any kind of change provokes uncertainties, and many employees are anxious about job displacement, according to Dr. Abbe Mowshowitz, director of the Croton Research Group, Croton-on-Hudson, N.Y.

More Drudgery

Dr. Philip Kraft, professor at the State University of New York in Binghamton, told an audience that instead of freeing up people, computing has frequently increased their drudgery. Kraft maintained that automating the office will affect not just the jobs of clerks, but would directly impact middle managers.

Unemployment for managers will become a reality as top executives will be able to get information directly from the automated source, bypassing middle management positions, he claimed.

"These mid-level managers are in for a rough time due to automation," and their work is being routinized and standardized just as it is with the clerical personnel, he noted.

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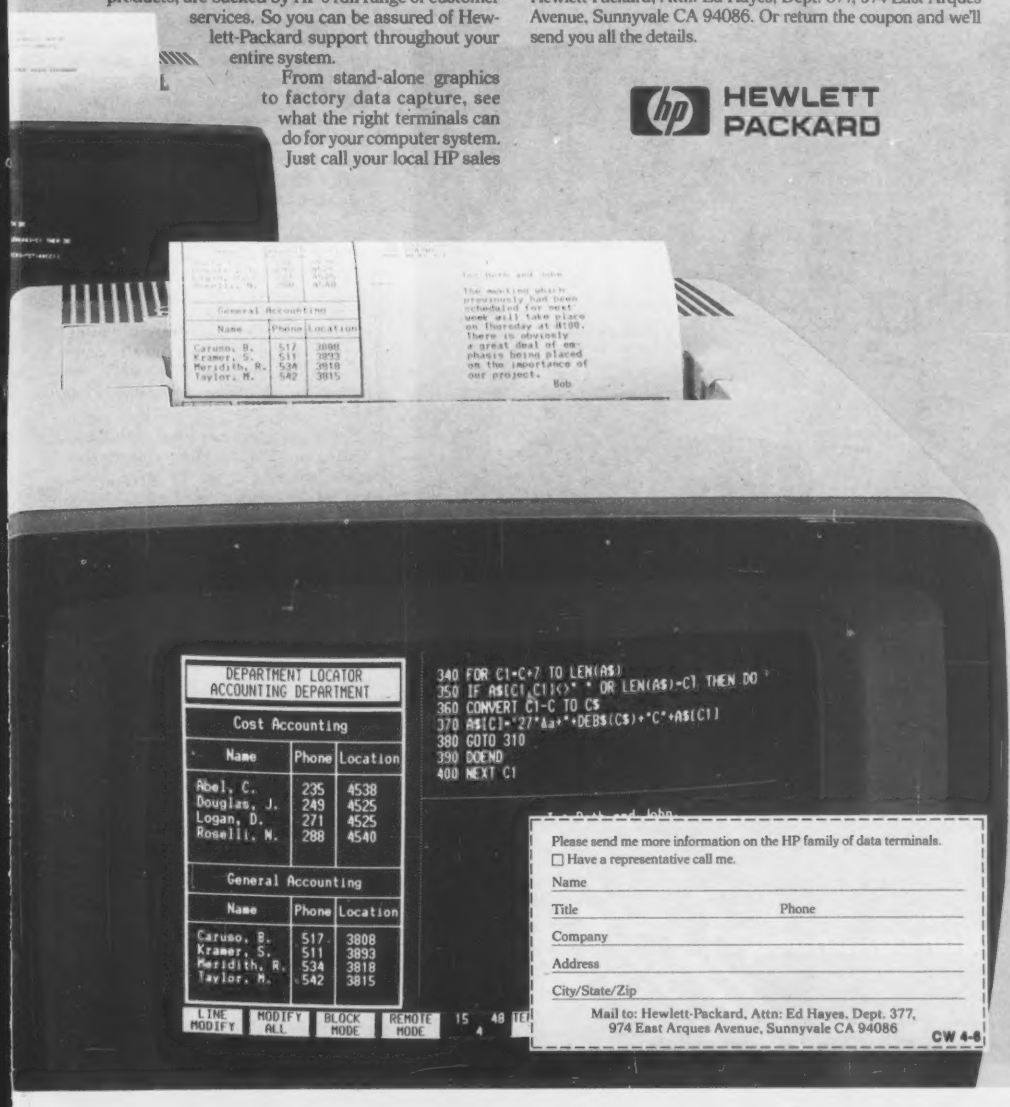

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Management Consultant Calls Modeling Technological Focal Point for Planning

By Rita Shoor
CW Staff

ATLANTA — "Technology exists to anticipate change," according to Kenneth Gartell, a management consultant with Ernst & Whinney, Inc.

And financial modeling can be a technological focal point for planning and decision making within the corporate environment, he informed attendees at a recent conference here.

A specialist in long-term strategic planning with a financial emphasis, Gartell felt that most companies are "less than aggressive" in terms of planning. This conservative attitude was probably a holdover from less turbulent economic and political times in the U.S., he said.

However, organizations are currently faced with rapid changes on many fronts, he continued. They operate in a business climate that includes severe business cycles, high inflation, scarce resources, extensive government regulations and reporting requirements, multiple labor and consumer demands, extremely rapid technological innovation and fierce competition.

A tool that will enable the organization's executives to determine ahead of time what the firm's priorities will be, rather than simply reacting to change as it occurs, is essential for success in this environment, Gartell observed.

Financial modeling is just such a tool, he claimed. It enables the planner who specializes in areas other than DP and information system design to quickly develop systems that top management can use for "effective and efficient" long-term planning.

Financial modeling is not a substitute for a management information system (MIS), Gartell stressed. It is a completely different concept and the only place that the models and larger, more traditional systems have to meet is in the mind of the manager, he said. "You don't need to do financial simulation with the entire corporate data base," he noted.

CW Photo by R. Shoor
Ernst & Whinney's Kenneth Gartell

Characterizing various financial modeling languages as "powerful, flexible and easy to use," he maintained that they enabled "DP-naive" financial planners to perform relatively sophisticated programming operations.

He mentioned Interactive Data Corp. (IDC), Control Data Corp. and Comshare, Inc. as representative vendors with products that allowed financial specialists to perform functions such as sensitivity analysis, statistical analysis and forecasting, risk analysis and report and graph generation with relative ease. This type of product is characterized by a business-like rather than English-like language, commands that usually consist of entire words such as "depreciation" and flexible data input.

Predicting fast growth for financial modeling companies in the next decade, he felt that these firms were very attractive to the "best and brightest" business school graduates.

Industry-Independent

Financial modeling is relatively industry-independent, he continued. Firms that specialize in manufacturing, health care, distribution, banking — even ranching — can all benefit by adding this process to long-term planning procedures, he said.

The models are used for cash forecasting and capital budgeting in the manufacturing area, he explained. But modeling also works for health care feasibility studies and can be used by bank loan departments to predict which businesses will fail and which ones have a better chance of success, he said.

Based upon his own experience with designing financial models on a consulting basis, Gartell offered the following guidelines for success during the model development process:

- Top management must sponsor and support the financial model.
- The model must address top management's objectives and goals.
- Start with a relatively simple model and keep it as simple as possible.
- Use a top-down approach — begin model development with the key issues rather than with the data itself.
- The model should be "deterministic" with clear and understandable relationships.
- Use familiar report formats.
- Documentation must be clear and up-to-date — particularly if the model will only be used on a periodic basis.

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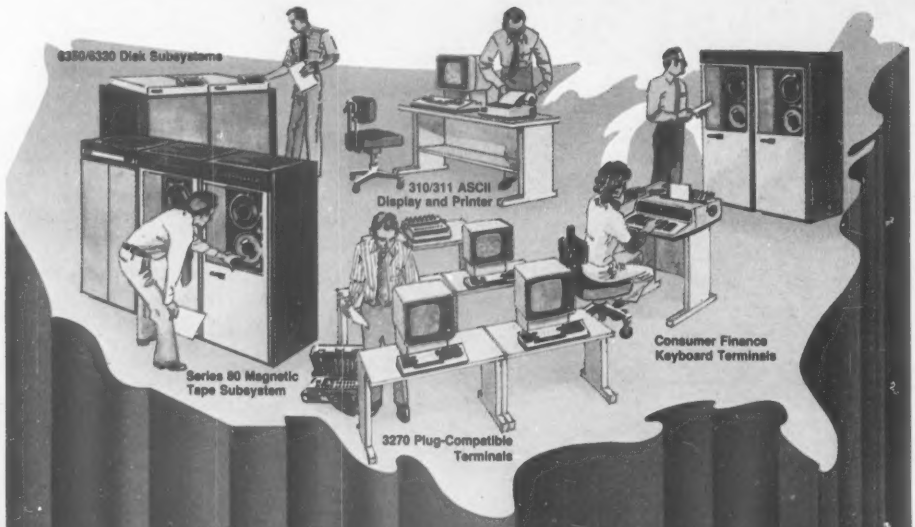

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To Remedy Shortage of Resources

Computer Science Net Aims to Link Academics

By Brad Schultz
CW Staff

MADISON, Wis. — A communications network for the nation's academic computer science departments is under development here to remedy the obsolescence and short supply of computing resources many departments experience.

The project brings together many of the nation's leading computer scientists and aims to establish open systems interconnection among many brands of computer systems popular with commercial DP users.

Cutting the ability of universities to train people qualified for programmer and analyst jobs, inadequate facilities and faculty salaries have driven many computer scientists from academia to industrial research centers, according to reports by the National Science Foundation (NSF) [CW, July 2, 1979] and the Computer Science Board [CW, March 16].

Already strained by a nationwide shortage of programmers and analysts, DP users may have to pay more for fewer available experts as universities reduce admissions to computer science programs, observers warn. The University of Wisconsin (UW) at Madison has already taken this step to keep faculty-student ratios manageable [CW, March 23]; other institutions expect to do likewise, according to spokesmen.

UW-Madison is also where computer science chairman Lawrence H. Landweber leads NSF efforts to establish a Computer Science Research Network (CSNet) over the next five years at a cost of $4.96 million. In its report, NSF recommended that computer science departments pool resources via an interconnecting data network.

CSNet will function similar to Arpanet — America's first packet-switched network — as a medium for dialogue among computer scientists and for researchers at geographically dispersed institutions to jointly develop systems and research papers, Landweber told *Computerworld*.

In fact, CSNet will have gateways to Arpanet, public packet nets such as those of GTE Telenet Communications Corp. and Tymnet, Inc., and Phonenet — described as a telephone-based message relay system. Initially, CSNet will provide message services, file transfer and access to remote data base and system resources, according to the CSNet Project Outline.

Many computer science departments at American universities are Arpanet subscribers because the Defense Department's Advanced Research Projects Agency (Arpa), steward of Arpanet, funds much of their research. Nonsubscribers will access CSNet via the public nets or, should that prove infeasible, via Phonenet or a so-called Public Host system.

CSNet will recognize the X.25 standard for plugging data terminal equipment into public packet nets, Landweber said, and participants in the development project will endow many common operating systems with appropriate interfaces.

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Managers on the Move

WILLIAM C. MANASCO has been promoted to vice-president, director of data processing, at Manufacturers Hanover Mortgage Corp. (MHMC) of Farmington Hills, Mich.

Manasco joined MHMC in 1978 as associate vice-president, director of data processing. Prior to joining MHMC he was employed at Jervis B. Webb Co., as director of data processing.

Manasco graduated from Wayne State University with a B.A in mathematics and economics.

•••

MACK MATULICH has been appointed manager of data services, New York District, for RCA Services Co.

Matulich is charged with maintaining procedures and standards for the installations, service and testing of data communications systems and associated equipment, supervising field personnel, ensuring customer satisfaction and promoting lease and service contracts within his district, which spans New York, New England and northern New Jersey.

Prior to this appointment, Matulich served as manager of field operations support in the Atlanta region. He joined RCA in 1968 as an office manager in Gretna, La.

He attended Richmond Professional Institute, the Old Dominion College and Louisiana State Univerisity at New Orleans.

DENNIS M. CONNORS has been appointed vice-president of management information services for Mervyn's 69 stores in six western states.

Connors joined Mervyn's in 1979 and was formerly director of data base administration. He was previously an executive with Levi Strauss and Co. and TRW Systems.

Connors is a graduate of El Camino College and holds memberships in the American Management Association and Data Processing Management Association.

•••

JOHN L. BERG has joined Standard Oil Co. in Indiana as manager of computing and information technology. Berg will follow emerging technology and recommend specific areas for monitoring, development or application by Standard.

Before joining Standard, Berg worked in Washington, D.C., as manager of system development at the General Services Administration and as senior computer scientist at the National Bureau of Standards.

Berg serves as secretary-treasurer of the Association for Computing Machinery's special interest group in the management of data. Until recently, he chaired the American National Standards Institute/Standards Planning and Requirements Committee's data base system study group.

•••

GARY W. HIRSCH and ROBERT J. ZUPSIC have been appointed managers of systems and methods for management information systems in the Finance Department of Koppers Co., Inc.

Hirsch will be responsible for the development and implementation of computer systems for the Engineering and Construction Group and other corporate and staff department activities. Zupsic will be responsible for similar activities for Koppers Forest Products Group.

Hirsch received a B.S. degree in mechanical engineering from Pennsylvania State University and an M.B.A. from the University of Pittsburgh. He joined Koppers in 1966 as a design draftsman and most recently was a systems consultant.

Zupsic received a B.S. degree in business administration from Geneva College. He joined Koppers in 1965 and most recently was a systems consultant.

•••

DAVID M. MALEY has been appointed to the newly created position of director of management information systems at Fedway Associates, a New Jersey distributor of wines and spirits. The primary functions of this post will be systems planning and innovative application of informational technology and data processing techniques.

Maley was an independent management consultant specializing in MIS planning in the wholesale distributional industry before joining Fedway. He also served as director of MIS for Shulman Transport and manager of coporate systems at Amerada Hess.

•••

JOHN W. SWEENEY has been promoted to vice-president of administration of the Eastern Division of Suburban Propane Gas Corp. He will also continue as assistant vice-president of Suburban Propane Gas Corp.

Sweeney joined the company in 1959 in the DP department. Prior to his promotion he was director of management information services and division planning manager. In his new position, he will be responsible for management information services, marketing planning, human resources and division planning.

Sweeney holds a B.S degree in accounting from Fairleigh Dickinson University.

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Then our NCC Show Issue comes out May 4th, the day of the show. It will have last-minute show information, speech previews and other show details. Pick up a copy at the *Computerworld* booth. Black and white ad close is April 23rd. Color close is April 17th.

Finally, our May 11th NCC Wrap-up Issue will have complete coverage of all that happened, prepared by our 25-person editorial staff. You'll read who said what, who introduced what and how it works, and review the show's features and highlights in words and pictures. Black and white ad close is May 1st. Color close is April 24th.

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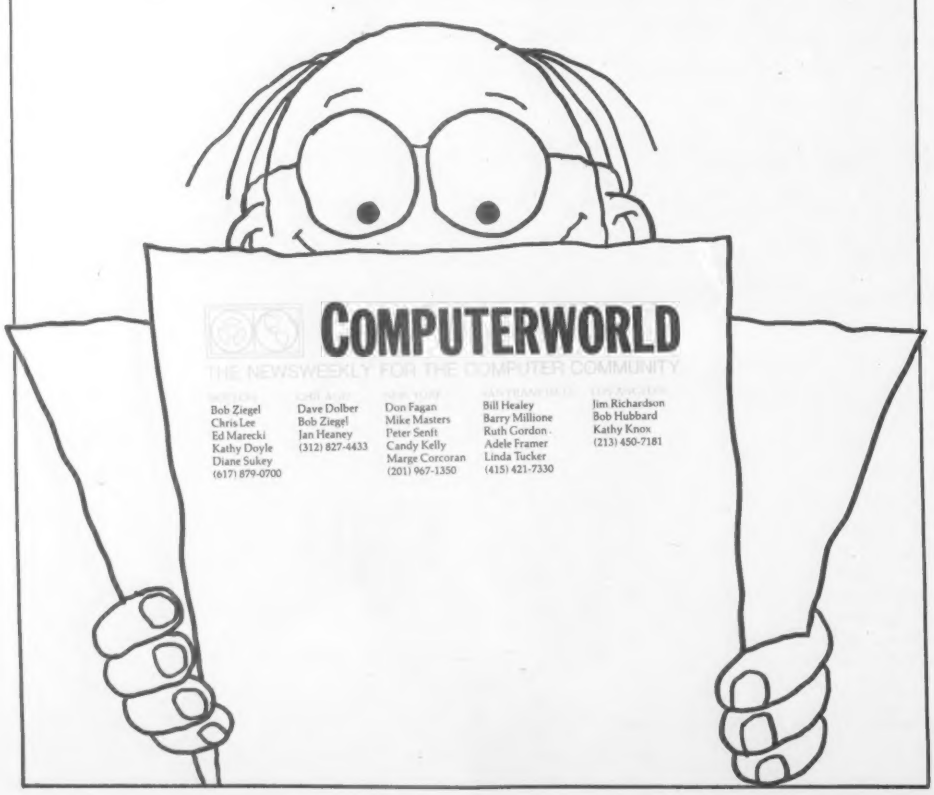

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By Hillel Segal
Special to CW

Having surveyed the results of 24 benchmark tests of computers in the $15,000 to $25,000 and less-than-$15,000 price ranges over the past several months in *Computerworld*, it is time to sit back and reflect on the deeper significance of the Association of Computer Users (ACU) Benchmark Reports. How should they be interpreted, and to what degree should success in the testing program be a criterion for purchase?

When the ACU undertook its program of testing popular small computers, established a set of test applications and found independent consultants capable of running the tests, we realized that other elements of a working computer system were just as important as the speed of operation. And we have always emphasized, both within our actual reports and in summary articles such as these, that the key to correct use of the comparisons is proper interpretation of the benchmark test times, coupled with an understanding of the environment for which each computer was designed.

It would be extremely foolish, in our opinion, to pick a computer based solely on its victory in one or more benchmark tests, even if it appeared to enjoy a substantial price/performance edge over the competition. What if it lacks adequate memory or disk storage for your particular needs. What if it has a language or operating system incompatible with other systems already in use? Or if it must be repaired at a factory shop far away?

These are just some of the questions the buyer must ask himself while glancing over the list of computers ACU has tested. To buy a computer on the basis of speed alone is just as unrealistic as purchasing a race car to drive on city streets.

Overview of Systems

Nevertheless, the benchmark test results do provide an objective basis for comparing the throughput of various complete computer systems — including the hardware, operating system, language and peripherals. Such an overall view of system operating speed cannot be obtained from conventional specification sheets because the elements of hardware speed (CPU cycle time, memory access rate, disk access rate) are only one part of the total equation.

In order to get a complete performance picture of computers in the testing program, a number of different benchmarks have been devised. These are divided into two categories: speed tests and real-life applications.

The speed tests include a group of CPU-intensive tests and a group of I/O-intensive (disk) tests. Neither of these is intended to directly simulate actual operation in the field. Instead, the tests repetitively excercise a specific function to determine the system's speed for that task. The CPU-intensive tests check the speed of two math functions: exponentiation and square roots.

The I/O tests, on the other hand, check only the speed of disk access. Using sequential access, factors such as head movement, storage capacity and data transfer rate can be measured in concert.

In the real-life application test category there are three types of programs: Accounts Receivable, Scientific/Engineering and New Product Planning. These simulate typical programs a user might run in a business or scientific application. All are run twice; once with output to the screen and again with output to the printer.

The Accounts Receivable problem is the program which most closely simulates a business application. It includes file creation and updating, arithmetic operations and other system functions associated with maintaining a record of customer accounts. Disk access is included among the tasks.

The New Product Planning program calculates the relationship of product costs and profitability for a hypothetical new product over a four-year period. A formatted report is displayed (or printed) with the results. The program uses no disk access during the run, and usually completes in 10 to 30 seconds, making it the shortest of the real-life tests. As a result, the hard-copy output run of this test is a good indicator of printer speed, in combination with the program run.

The Scientific/Engineering problem is an excercise in solving simultaneous equations. Using the Gauss-Jordan method of elimination, the program solves 50 equations with 50 unknowns. Again, no disk access is utilized within the program.

Examine Needs

The benchmark tests run the gamut from repetitive disk access to complicated math problems, so it is important to have some idea of what *you* want from a computer before looking at the times of test results. Some users hardly ever use the disk drive except to store programs on — they do not need to create files in the middle of a program run so the speed of the disk is of little consequence to them. Others are constantly accessing files and updating them, and find systems slow in this area have a potential bottleneck. Users with different requirements such as these should be looking at different test times to see if the critical subsystem is up to the job.

While this series of articles in CW has focused on the Scientific/Engineering and Accounts Receivable application problems, the other tests are useful in examining the entire computer system in depth. For readers who wish to do so, we recommend reading the original Benchmark Reports from which these articles were derived.

Flexibility Key

The expandability of a computer system is one of the most important areas for those either buying their first computer or those users in organizations where the rate of growth is substantial. Too often, customers purchase a system "perfect" for their needs — but discover that when their volume doubles, the computer cannot maintain the needed records or process the information in a timely manner.

Of course, no system can expand indefinitely. Sooner or later, limitations of memory expansion or disk drive capacity stop the growth of the computer. There is always a realistic limit to how many terminals can be connected or how many records can be filed with a particular piece of central hardware. If you have to switch manufacturers in order to get a bigger system, these aspects may prove very tricky.

Finally, one very important area of concern should not be left out; the personality match between vendor — the local dealer or factory representative — and customer. Some computer users need a lot of what the industry calls "hand-holding."

To sum up, selecting a computer system involves more than comparing system speed and price. The right computer comes with all the required features, expandability, software and customer support. Do not settle for anything less.

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Hewlett-Packard 250	23,650
Texas Instruments DS990/2	18,740

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This is the twenty-seventh in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and many other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new 24-page report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete package of information about the benefits of membership in the Association of Computer Users is available from them through P.O. Box 9003, Boulder, Colo. 80301.

Control Systems at Issue

Computer Design Foul-Ups Idle Seattle Ferries

By Robert Glass
Special to CW

SEATTLE — Three brand-new Washington state ferries, embroiled in high-potency controversy, are sitting idle amidst technical and political charges and countercharges. The focus of the flap is the computerized control system on the ferries.

Ferries are part of the mainstream of the Puget Sound transportation system, which serves thousands of commuters and is the only connection between Seattle and several nearby smaller population centers. The new ferries, largest in the fleet, were bu[illegible] to help alleviate a serious overload on the existing system caused partly by the sinking of the Hood Canal floating bridge in a windstorm more than two years ago.

The ferries were pressed into use soon after their launching, but a series of problems — some spectacular, such as the ramming and temporary destruction of one of the ferry docks — finally caused some ferry system engineers to band together and issue a public statement that the ferries were dangerous. The danger, the engineers said, was caused by erratic and unpredictable behavior of the ferries' computer-controlled propulsion systems.

Administrators of the ferry system at first denigrated the charges, then later gave in to them and took the ferries out of service. But the controversy escalated as both legislative and journalistic investigations of the problems were conducted. The builder of the three vessels, for instance, charged that ferry engineers "are not mentally fitted to operate" the computer control system; the engineers fired back "that kind of trash isn't worth a comment"; and an independent consulting firm found "fundamental" problems with the computers.

Complex Tangle

Further investigation identified a complex tangle of business relationships involving production of the hardware and software for the computer control system. According to a *Seattle Times* investigation, the contractually identified builder of the computer had not even been incorporated at the time the computer design work began, and two people listed as members of the company's board of directors had never heard of it.

The software appears to have been built by a company formed expressly for the project. More than one company has gone bankrupt during the hardware/software design and implementation effort. Several key people in various involved companies have so far declined to discuss their roles. Investigators have taken to calling the controversy "the computerized ferry mystery."

The ferries are the first of six to be built under a $106 million contract. These three alone cost $54 million. The impact of that kind of investment being unusable for what has now been over two months has been serious on the already-strained ferry system.

Computer controls were selected for the ferries because they could contribute to propulsion system fuel economies. The computers are a standard microcomputer chip augmented with considerable application-specific hardware and software.

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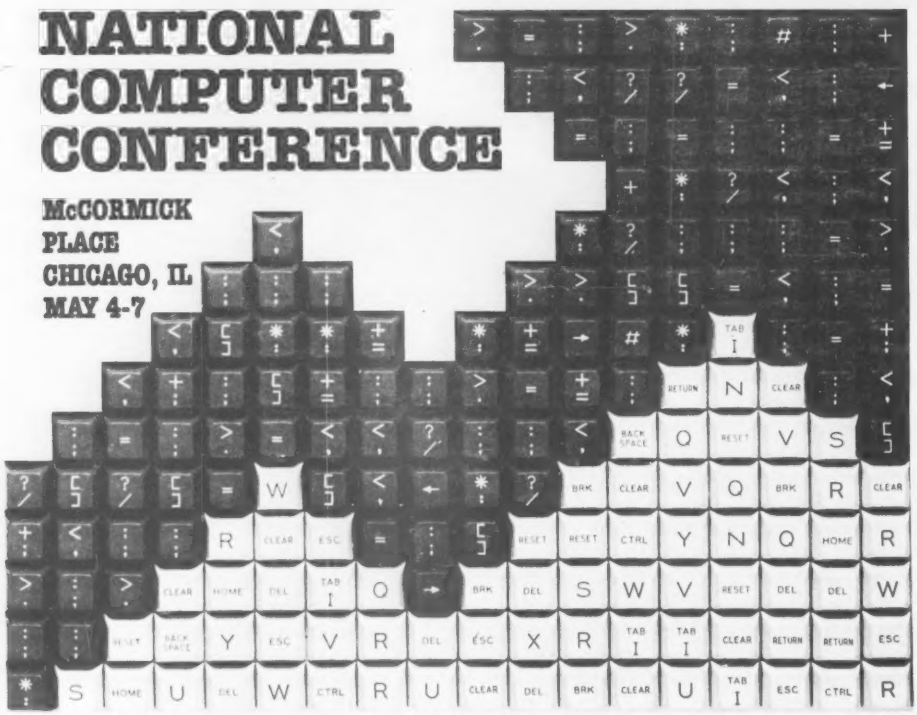

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NCC '81

IDC Appoints Federal Director

WALTHAM, Mass. — International Data Corp. (IDC) announced the appointment of Marina V. Young as director of its newly created Washington, D.C.-based Federal Division, and she in turn announced the division's first product: an information service reportedly designed to help federal policymakers work within the federal system to obtain hardware and software services.

Young, who joined IDC from Datapro Research Corp., said the Procurement Information Management System (Pims) will provide its clients with an overall perspective on developments in the federal government by monitoring such regulatory agencies as the General Services Administration, Office of Management and Budget, National Bureau of Standards and House operations.

More information about Pims is available from IDC Washington, Suite 1200, 8150 Leesburg Pike, Vienna, Va. 22180.

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Richard Nolan, President
Aerospace Nylok Corp.
Hawthorne, New Jersey

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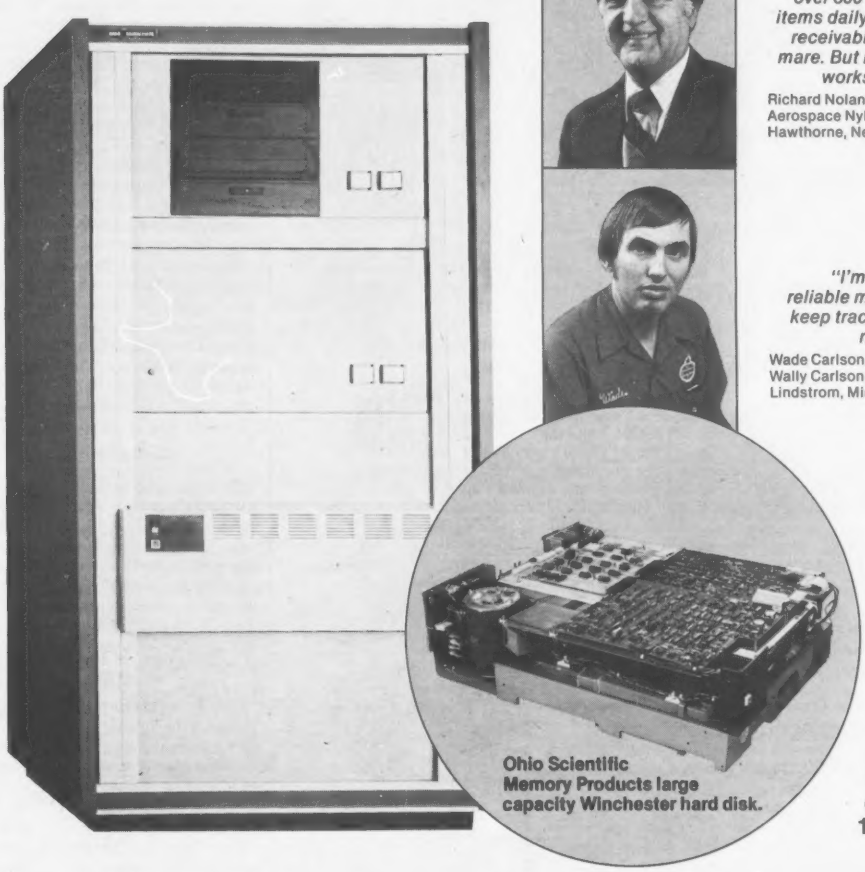

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CW Photo by B. Johnson

Software Innovations' Evan Grossman

Software House Formed By 16-Year-Old Executives

By Bob Johnson
CW Staff

GREAT NECK, N.Y. — The fact that Software Innovations, Inc. produces and distributes personal computing software is not unusual. What is unusual about this company is that its oldest executives are only 16.

The company started about a year ago in the basement of Evan Grossman's house here. Start-up capital included $100 investment donations from parents and the selling of shares in the company for $25.

Top management at Software Innovations includes Grossman, 16, who is in charge of stock, advertising and the company catalog; Roy Niederhoffer, 14, who fills orders and produces mailing labels; Steve Sanders, 16, the company treasurer; and Tim Binder, 16, who handles mailing lists and is in charge of printing company material.

This is a closely knit, shirt-sleeves management team. All the executives pitch in to produce the company's marketable software.

Research and development of the company's products is done on three Tandy Corp. Radio Shack TRS-80 microcomputers and one Apple Computer, Inc. micro. Grossman, the company's spokesman, said that he and his associates learned to program in various ways, mostly from playing games on computers.

Grossman said he started to learn programming at age 11 at Camp Killooleet in Vermont when a camp counsellor brought up a Digital Equipment Corp. PDP-8/E minicomputer and they played various games on it. Grossman said he can now program in Basic, Fortran and assembly.

The software company's most famous product to date is a "Space Invaders"-type game for micros called "Alien Invasion." It was the first of its kind to run on a TRS-80, Grossman said.

The electronic game market is the primary interest of the fledgling company, which has also produced modified versions of "Breakout" and a car race game for the TRS-80. The company has also produced what it believes is a unique computer Monopoly game that does not require a playing board and that allows trading and plays by standard Monopoly rules with only two minor changes.

Software Innovations is currently developing a "Name That Tune"-type game called "Name That Song" with the musical director of the Broadway show "Annie," Arnold Gross. "This is really a sophisticated program," Grossman commented. "It's amazing what we can do."

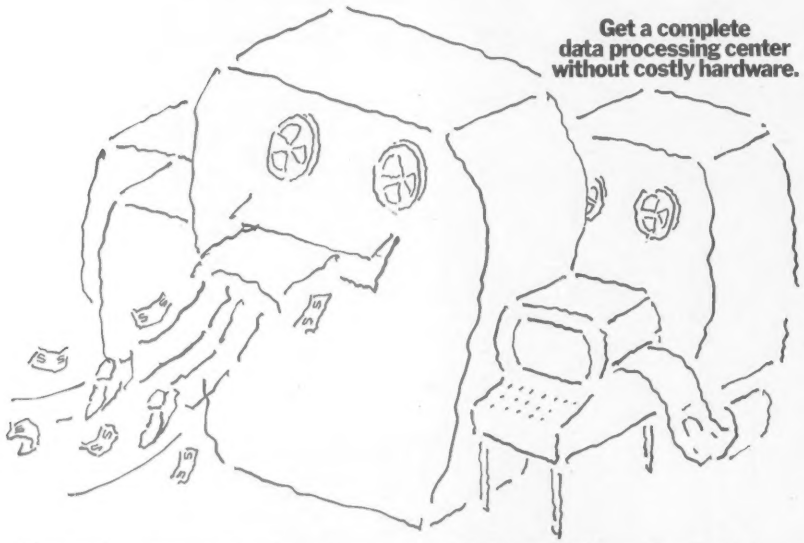
Serious Business

Marketing their products is serious business to the young entrepreneurs. Specially produced dealer packs are sent out to prospective customers through Software Innovations' worldwide mailing operation. The company's merchandise is stocked in a corner of Grossman's basement, but is shipped from the company's shipping department — on top of his pool table.

Financial results the first year were mixed. The company just about broke even, but the principals feel the only way to make it a success is to reinvest earnings and not to worry about profits at this point. Loans are being paid off and some of the company's programmers are earning royalties on their software.

The company's future, Grossman believes, lies in on-line consumer games. Grossman mentioned that in the interest of market research he sometimes goes on-line to MIT's DEC PDP-11/45 CPU to do some "fooling around."

The company directors declined to comment, however, when asked if it was OK for them to bring a terminal to the school prom.



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To Ease Emotional Problems

Writer's Flowcharts Map Psyche, Self-Esteem

By Bob Johnson
CW New York Bureau

NEW YORK — A documentation writer for Manufacturers Hanover Trust Co. here has discovered a unique way of solving his personal problems by using the principles of flowchart plotting.

Michael Krawetz, a DP specialist and journalist, was blasted emotionally over a year ago when his only brother was killed, his woman walked out on him and he received seven rejection notices from book publishers — all within a 12-hour period.

Feeling totally stripped of all self-worth, Krawetz wondered why there was no book or manual that would help emotionally broken people get back on their feet. It was at that point that he decided to write his own book on the subject, *Self-Esteem Passport*.

While plotting a flowchart for a cash flow system at Manufacturers, Krawetz realized that documentation writing was a highly disciplined form of writing that allowed for no margin of error. Therefore, the results had to be logical.

He figured that if a computer could work out problems logically, step by step as they appeared on a flowchart, a person could also plot out his problems to discover a logical solution.

Brain as Data Base

Krawetz looked at the human brain as one huge data base containing all of the files that make up a person's personality. Contained in these files, according to Krawetz, are all of the positive aspects of one's personality that should be accessed in order to find that logical solution.

"At the time when I had these problems, my mind was not my friend. Everything I needed was in my files, but I couldn't access them to help me," he said.

By using the methods in flowcharting, Krawetz was able to draw out the good experiences of his life. His central data base was his "self-esteem" data base, which he broke down into files such as the "Be Proud of Your Looks" file, the "Self-Confidence" file and the "Respect to Others" file.

Krawetz claimed that all of these files make the person aware of things he may have forgotten. Together they yield a "Self-Esteem" printout.

Krawetz has published the book on his own. "Self-Esteem Passport" is printed in passport format with a brown leatherette cover; it includes sections for the reader to list his best traits and space for favorite photos.

While most readers will not notice the book's flowchart structure, Krawetz's DP colleagues understand the concepts of its self-awareness documentation and have agreed with his methods.

"A programmer or DP type can pick up on the idea behind the book and utilize it more effectively because of their constant dealings with logic and structured programming," he said.

The author felt that everyone is concerned about machines thinking like people nowadays, but he added that in times of stress people may be wise to think a little more logically and perform the way machines do.

Seminar Slated For MIS Execs

BUFFALO, N.Y. — A seminar on "Data Management and its Impact on Your Organization," has been organized by Computer Task Group, Inc. for presentation in 16 cities this spring.

The seminar is aimed at management information systems (MIS) executives and user department managers and was designed to provide an overview of some of the key data management concepts and their implications for organizations.

The seminar series will be conducted by Paul Hessinger, a research consultant specializing in the fields of data base and data communications. Further information on the seminar series is available from Computer Task Group, Inc., 800 Delaware Ave., Buffalo, N.Y. 14209.

Engineers Target Of MIT Session

CAMBRIDGE, Mass. — MIT has announced a summer program intended for engineers within industry entitled New Developments in Modeling, Simulation and Optimization of Chemical Processes, scheduled for July 20-29.

The program covers such topics as computer-aided design and control of industrial-scale chemical processes, steady-state process simulation, process optimization, dynamic modeling and simulation of chemical processes.

Tuition costs $950 and more information is available from the director of the summer session, Room E19-356, MIT, Cambridge, Mass. 02139.

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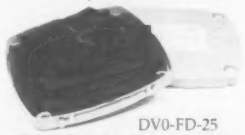

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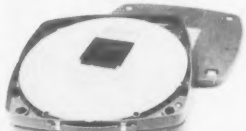

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Library System Cuts Losses $20,000/Year

COLORADO SPRINGS, Colo. — A computerized library system saves the Penrose Library and its nine branches in the Pikes Peak Library District about $20,000 a year on lost books by keeping close track of the more than 350,000 books in the library's inventory.

The system uses a bar-coding procedure to monitor the books' circulation. Patrons use light pens when they check out a book and the system automatically records the date and the due date. At night, through a batch process, the computer checks the file for overdue books and generates notices, which are mailed to offenders. The notices go out every two weeks and, according to Kraft, this has made it possible to locate books that previously would have been considered lost.

The library system, built around a Digital Equipment Corp. PDP-11/70 also stores information on-line on community news such as a calendar of events, listings for the Colorado Springs educational and referral center, day care centers and social clubs. There is a car-pool information bank, which Kraft said will be expanded in the next year to include bus timetables and other transportation information.

The nine branch libraries communicate with the CPU using Racal-Vadic, Inc. 1,200 bit/sec modems. Kraft said there are 75 Hazeltine Corp. 1500 and 1420 CRT terminals on-line at present with plans to increase that number to 95.

People with home computers can use the system on-line if they have a 300 bit/sec modem. The library provides the link-up service free and issues contracts to patrons using their library identification card numbers as access passwords. The users, who number about 75, can call up the information in the library system on one of six dedicated dial-up lines.

The system, which has 1.5M bytes of core memory, is almost running at full capacity according to Kraft. "It can't be expanded much more now. I have been told that it is one of the seven largest PDP-11 installations in the world," Kraft said.

Kraft estimated that it costs $40,000 per year to run the computer, not including the peripherals, but maintained that it saves the Penrose Library money in the long run because it keeps a closer check on the books and has cut down the need for staff in the circulation department.

Microchips Save Shrimpers' Fuel

BILOXI, Miss. — The Mississippi Gulf Coast shrimping industry has suffered recently due to high fuel costs, and now a research project, using microchip-based monitoring devices, is looking into ways to reduce shrimp vessels' fuel consumption.

"What we are trying to do is characterize the fuel consumption of the shrimping industry by researching patterns for the entire fleet," David Veal, director of the program administered by the Sea Grant Advisory Service here, said.

The microchip-based gauges Sea Grant uses were designed by Johnny Johnson from Texas, who plans to market them at a later date at a cost of between $4,000 to $5,000. Veal uses three at present.

The gauges record how many gallons of fuel are used per hour, per day and under different circumstances. One major discovery is that vessels that use twin trawls, that is two small nets on either side of the boats instead of one large one on either side, use three gallons per hour less fuel.

A Sea Grant employee goes on board a shrimp vessel to record the computer's readings because as yet it does not have recording equipment. "We hope to help the shrimping industry better manage fuel consumption since we cannot do very much about vessel design. Fuel cost used to be an incidental expense. It is now a major expense for the fishing industry," Veal said.

'Quite a Gadget'

Capt. Tommy Schultz of the Reva Rose, a 75-ft Biloxi shrimp vessel, was impressed with the device installed on his boat. "When they first put this computer on board I was not very enthusiastic. I thought this is just another piece of junk, but it really is quite a gadget," he said.

The vessels owners do not pay for the computers. The project itself is funded by three agencies: the National Marine Fisheries Service, the Mississippi and Alabama Sea Gulf Consortium and the Gulf and South Atlantic Fisheries Development Fund.

Veal said he installed the first device last November and will continue the project through the summer. The computers are moved from vessel to vessel in the shrimping fleet once a boat's pattern of fuel consumption is established.

Besides recording such information as fuel consumption based on the equipment the shrimpers are using, the computer also gives the ships' captains up-to-date information on such things as the amount of fuel left on board, the percentage of fuel used, the percentage of fuel left on board and the total amount of fuel used in a 24-hour period.

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Season When Sun Never Sets

Mini Goes to South Pole to Spot Solar Activity

SOUTH POLE, Antarctica — Antarctica, where temperatures dip to minus 50°F in summer, is not often associated with sun gazing, but a group of researchers here used a minicomputer, telescope and camera to photograph solar activity during the season when the sun never sets.

The Computer Automation, Inc. Naked Mini 4/10 minicomputer and intelligent cable Picoprocessor adjusted the solar telescope so the sun was continuously reflected in the telescope's tube through a heleostat. The computer also performed a rotation correction that keeps the solar image at the desired orientation for the camera photographing it.

Programming of the computer for the solar astronomy application was done in Sweden under the direction of the Royal Swedish Academy astronomers.

"It was a hard-wired program that meant it was not programmable in the field. It did quite well, but there were some bugs that we couldn't correct. It needs to be more flexible," according to Dr. Martin A. Pomerantz, director of the Bartol Research Foundation of the Franklin Institute at the University of Delaware. He served as leader of the team of solar physicists and astronomers who spent last winter in Antarctica as part of the U.S. Antarctic Research Program.

The team brought the computer system back to the U.S. to correct the mistakes and the team expects it to work better next November when they return with it to the South Pole.

Control Functions

"During a 24-hour period, the sun moves in a complete circle around the sky, at a nearly constant elevation above the horizon. As the heleostat mirror turns to follow the sun, the image projected in our observatory rotates 360°, and the NM 4/10 computer must continually correct for that rotation," Dr. Pomerantz said.

In addition to keeping the heleostat pointed properly and orienting the solar image, the Naked Mini performs several control functions in the process of photographing the image. For example, it causes the camera to shift automatically from one area of the sun to another, according to a predetermined schedule.

"We want to be monitoring things that are happening in several different regions of the sun," Dr. Pomerantz said, "so the computer will follow our instructions about where we want to look, as well as controlling things like photographic exposure."

The expedition's main objective is to observe the growth and evolution of "supergranules." These are specks visible on the sun's surface, each about a thousand miles in diameter. Dr. Pomerantz explained that an understanding of solar supergranules and their interaction with sunspots and other solar phenomena will be valuable for further comprehension of the 11-year sunspot cycle currently at its peak of activity.

The system costs about $2,075 for the minicomputer and $250 for the Picoprocessor.

POS Terminals Keep Tab On Retailer's Inventory

HEMPSTEAD, N.Y. — The survival of a retail merchandiser in a time of recession depends directly upon inventory control. Maintaining a delicate balance of adequate, but not over-abundant, amount of stock is crucial.

For Highway Textile, which markets household textiles in the Eastern U.S. and Puerto Rico, this is a special challenge. Unlike high-fashion items such as women's garments, or durable goods like stoves, Highway's merchandise falls into what one observer has called a "never-never land" in which hard and fast rules do not exist.

Arthur Berkell, the firm's general manager, saw the potential for an inventory-control problem to occur as far back as 10 years ago. A year ago, the decision was made to install point-of-sale (POS) terminals from the TRW-Fujitsu Co., and the problems that could have developed were averted.

"Curtains, linens, rugs, mats and appliance covers don't have the aura of fixed investments that people associate with stoves or refrigerators. Purchasing them usually doesn't require planning or saving. They may be bought for almost any reason — or for no reason at all."

That is what makes inventory control so difficult in this business, he noted. There are no rules. Demand is not predictable the way it is in fashions or durable goods. Add to that the fact that Highway Textile deals in high-volume discount sales throughout a large territory and the problem becomes apparent.

"I knew that the solution was a POS terminal with enough intelligence built into it that it could function as a true intelligent terminal for a fairly sophisticated inventory-control system," Berkell said. "TRW's 2001 terminal met my needs."

The 2001 is a microprocessor-based POS terminal featuring a video display that leads operators through each transaction step by step in nontechnical English — or, in Highway's Puerto Rico stores, everyday Spanish.

Data collected from the system provides management reports to assist decision making about inventory, sales, productivity and cash availability. The terminal is programmable, allowing customization of the system to meet the needs of each retail establishment.

Berkell noted that the choice put to the small or medium-sized business faced with an information-system problem is too often to simply go out and buy some equipment. However, after the equipment is purchased, software is needed to manage the problems.

TRG Systems, a Rhode Island software house that has done a great deal of work with retail merchandisers, was chosen to supply the software.

"The 2001 has a cash drawer attached, rather than a cash register with added-in electronics. We're operating 12 of the terminals now."

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Package Trims Budget Time for Figure Salons

MILWAUKEE — One of the country's chain of figure control salons for women has discovered the advantages of using a financial modeling package to reduce the time spent on budgeting.

Elaine Powers, which serves more than three million American women, has a complex budget system requiring individual budgets for more than 270 salons, some of which are company-owned and some of which are franchised. Each salon has a budget which becomes part of the consolidated corporate budget, a spokesman explained.

ADP Network Services' financial modeling system (FML), was installed about a year ago. It has resulted in a 25% reduction in budgeting time and lessened the confusion and complications of consolidating 300 sets of figures.

The package migrated to the Elaine Powers corporate offices here via Carmelita Soria, a financial analyst. Her previous position involved working with the financial modeling system. When she obtained her current position, FML came with her.

The company was founded by Dr. Richard Proctor, now chairman of the board, who recognized the need for an effective figure improvement program for women. He developed the program and exercises and personally designed much of the equipment currently used in the salons, the spokesman said.

The package fits this context since it has trimmed away the excess in the budgeting process through improved figure control.

ADP also offers specialized computing services, applications programs and general time-sharing in financial management, investment analysis, accounting, project management, stategic planning, econometrics and statistics, he noted.

Its range of financial services includes fixed assets management and pro forma analysis as well as modeling and forecasting he said.

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NCC '81 To Use Largest Space In NCC History

CHICAGO — This year's National Computer Conference '81, scheduled for May 4-7 in McCormick Place here, will use the largest exhibition floor space in NCC's history with the opening of the lower concourse level of McCormick Place.

More than 525 exhibitors have reserved space, compared to 460 at last year's conference in Anaheim, Calif., according to the organizers. And this year the NCC Personal Computing Festival exhibits will be integrated within the main exhibit area, although the Personal Computing Festival program is separate from the main conference program.

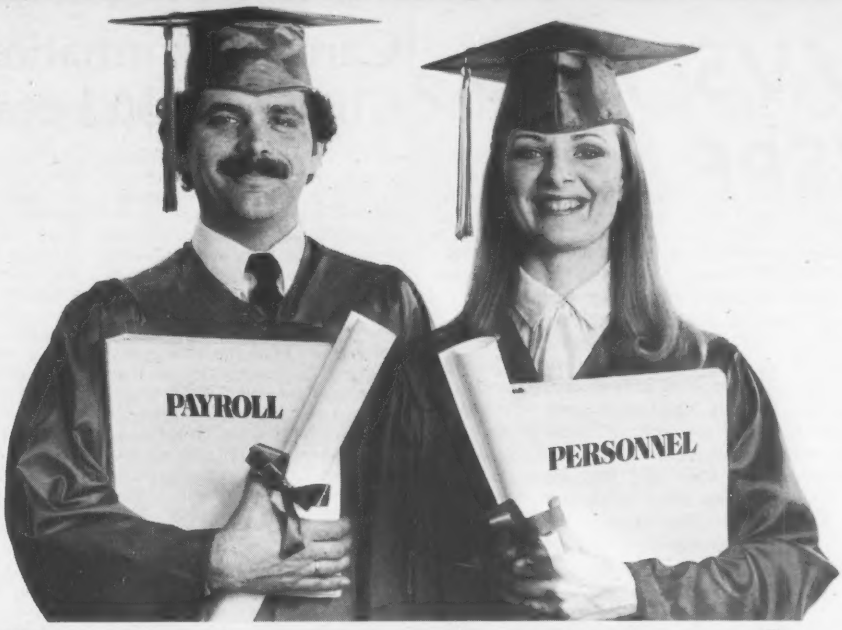
The advance registration fee of $60 entitles entrance to the exhibit area, admission to 100 sessions in the main program, to the Personal Computing Festival, 21 professional development seminars and a Pioneer Day program that looks at the historical developments of the computer industry. On-site registration costs $75 and more information about the conference and housing facilities is available from Afips, P.O. Box 9658, 1815 N. Lynn St., Arlington, Va. 22209.

Symposium Set For Washington

WASHINGTON, D.C. — The Fifth Annual Symposium on Computer Applications in Medical Care is scheduled for Nov. 1-4 at the Sheraton Washington Hotel here.

The symposium will include theoretical and practical treatment of the use of information technology in health care and is designed to inform physicians, health care administrators, biomedical scientists, engineers and information technology specialists about current and potential applications.

Papers and workshop planning for the symposium is still under way and more information is available from Henry G. Heffernan, Office of Continuing Medical Education, 2300 K St., N.W., Washington, D.C. 20037.



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Career Information System Covers 2,200 Locations

By Deborah Wise
CW Staff

LANSING, Mich. — An occupational information system run by the state of Michigan is providing free career advice at more than 2,200 locations in the state through 600 computer terminals and a microfiche service.

The system, developed over the course of two years and made operational in 1977, carries information on 378 occupations with 1,400 suboccupations, and in its computer form has interactive capabilities, according to Jim McGarvey, the program's director.

Ninety-six percent of the service subscribers are Michigan high schools that have found that classroom participation and response is better when students have some idea of a career goal, McGarvey said.

In this respect, the system can help in the classroom environment. Its first service, called a structured search, prepares a personal profile of a student by establishing what kind of working environment he or she is looking for. Given this information, the system then matches it up with the kinds of jobs likely to appeal to the student.

Under each job classification category there is information about the number of people employed in that occupation in Michigan, the salary scales, a projection of job opportunities in that field in the next five years, the type of working conditions and the educational requirements required to enter the field.

Educational Requirements

In addition, the system lists the places where the educational requirements can be fulfilled, the cost of such courses and the name of a person to contact for more information. The student can also get information on the best kind of high school program to follow for a chosen career.

"There is a wealth of information that is easy to access and the computer version is particularly attractive because it is interactive," McGarvey said.

On a local level the program can be updated to carry specific job vacancy listings in a given area, although this information must be provided by the individual regional authorities. The central data bank is updated annually by a staff of seven from the Educational Service Commission, which supports the system along with the Michigan Department of Education and the Department of Labor.

The program is written in Basic and runs on most major computer systems, McGarvey said. He also mentioned that the Department of Education had custom-built its own large microcomputer to be dedicated to the system so that it need not tie up the computing resources of Michigan state facilities.

The system is also available on smaller micros and McGarvey's office has received more than 520 requests for versions to run on Apple Computer, Inc., Commodore Business Machines, Inc. and Tandy Corp. Radio Shack microcomputers.

McGarvey said that the system is specifically designed for Michigan, and although other states have expressed interest in having his department set up similar systems for them, McGarvey prefers to offer advice and examples of his support documentation rather than creating a system for them. "We have worked with other states on similar projects, but what we encourage them to do is to take what we have done and mold it for themselves," McGarvey said.

The annual budget for running the system is $500,000. McGarvey hopes that any cuts in the Michigan state budget will not affect the program. "In the long run it wouldn't pay to cut a program like this because it helps the employment record of the state," he said.

Defense Said Getting Serious About ISA Standards Activity

WASHINGTON, D.C. — The Department of Defense (DOD) is getting serious about its computer instruction set architecture (ISA) standards activity, according to a draft Air Force standard released March 5 of this year. The draft standard is written as a supplement to Air Force Regulation 800-14.

The ISA activity is an attempt to make it more possible to produce reusable software and to minimize software training costs by hardware standardization. An ISA is a standard software interface definition that will be required of hardware vendors selling computers to branches of the DOD. ISAs specify all elements of a computer's hardware which software must know about, such as the instruction set and the register architecture.

In the draft proposal, two ISAs are singled out for acceptability — MIL-STD-1750, an Air Force-developed minicomputer standard based on the architecture of a militarized Westinghouse Corp. computer, and MIL-STD-1862, a medium-size computer standard which is called "Nebula" and has been likened by some to the Digital Equipment Corp. VAX computers. According to the draft proposal, only these two computer ISAs "may be used in Air Force defense systems and subsystems unless it is demonstrated that neither . . . is technically practical or cost-effective over the system life cycle." The DOD has been extremely reluctant to grant waivers from standards involving software in recent years.

The draft proposal goes on to single out certain commercially available products for unacceptability. "Use of commercial products such as MIL-SPEC-qualified microprocessor chips . . . in lieu of standard ISA implementations also requires a waiver."

An approval process will be required for the draft proposal, but it is unlikely that the proposal or something quite similar to it would be rejected.

Accurate Reflection?

Model Gives Common-Sense Look at Gas Lines

By Bill Laberis
CW Staff

COLUMBUS, Ohio — What do tank-topping, the U.S. Department of Energy, human behavior, toilet paper and Johnny Carson have in common?

These seemingly unlikely bedfellows all help interpret and extrapolate the findings of a U.S. government-sponsored computer simulation of the gasoline queuing phenomenon.

The conclusions drawn by Battelle Columbus Laboratories from the Gasque model, designed to suggest remedies to deal with the gas lines should they crop up again, are totally common-sensical. In fact, one may wonder why a computer model was needed to arrive at the conclusions in the first place. The conclusions included:

- Implementation of a weekend opening requirement reduces the length of lines.
- Decreases in station operating hours lengthens lines.
- Tendencies for motorists to "top off" their tanks will increase the length of lines.

Battelle researcher Ralph E. Cooper said that data gathered in compiling Gasque raises some questions about whether the long gas lines of 1979 had anything to do with actual shortages of fuel.

"The point is that our simulation model works whether there is a real shortage or not, and that the gas lines were perhaps as likely to have been a consumer thing as much as a real shortage," Cooper said.

Here's Johnny

Enter Johnny Carson and toilet paper.

It seems the reigning king of nighttime TV once said, as part of a joke, that there was a toilet-paper shortage. By the end of the next day, concerned consumers had bought out available supplies, thereby creating the appearance of a shortage.

"Similarly, gas lines can be independent of a real shortage if people believe there is or will be one, and then react or panic, thus giving the appearance of a real shortage," Cooper said. "At any rate, it doesn't much matter in our model."

In 1979, warning signals of an impending gas shortage emanated from the U.S. Department of Energy in early spring, signals which triggered other red flags and stimulated media interest, all of which could have created a quasi-panic situation, Cooper said.

However, Gasque's chief recommendation for reducing gas queues — mandate weekend openings of gas stations and implement maximum purchases — assumes that there is enough gas available to do so.

And with deregulation fever catching on rapidly, there is some question whether anyone can legally mandate gas station openings at all. Battelle's findings were reached before the current administration took office.

Valuable Findings?

So, just how valuable were Battelle's computer-based conclusions, and how warranted the federal expenditure to finance them?

"We were able to accurately simulate the entire range of government regulations used in the past to deal with gas lines," Cooper said. "For example, we were able to conclude, contrary to previously accepted queuing theory, that odd-even purchase plans tend to make the lines even worse. Our findings were supported, too, by the actual experiences of 1979."

The Gasque simulation was programmed using the Gasp IV simulation language supplemented by Fortran IV coding, all run on Battelle's Control Data Corp. Cyber 7400 computer.

Argonne Offers Sabbatical Posts

ARGONNE, Ill. — The Department of Energy's Argonne National Laboratory is accepting applications for its Faculty Research Leave program that was designed to give university professors the opportunity to spend their sabbatical leave working at this federally funded research and development center.

Areas of study the scientists in residence can pursue include nuclear reactor research, solar energy, thermonuclear fusion, fossil energy and conservation, research in basic energy sciences and high energy physics and biomedical and environmental research.

The program began on a pilot scale in autumn 1980 with 15 faculty members from universities nationwide.

Those interested should submit a resume, publication list and brief statement of their area of research, along with a letter of interest from an official from their university, to Office of the Director, Argonne National Laboratory, 9700 S. Cass Ave., Argonne, Ill. 60439.

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Supercomputer Joins Search for Energy Sources

Special to CW

ROCHESTER, N.Y. — A key focus in the worldwide search for new energy sources may very well be right here at the University of Rochester's Laboratory for Laser Energetics (LLE).

Using a Control Data Corp. Cyber 175 supercomputer, the laboratory researches the feasibility of controlled thermonuclear fusion as a future and virtually inexhaustible source of energy to meet the nation's needs.

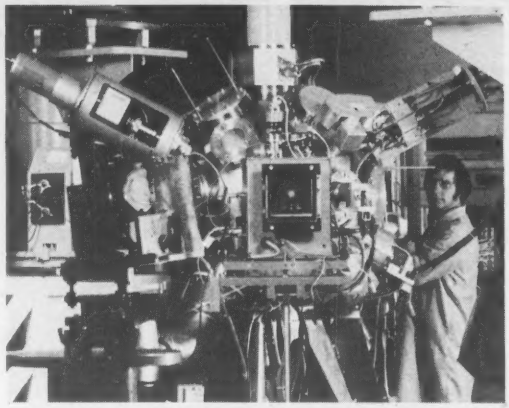
Functioning as a tool, the computer aids scientists with complex equations and handles huge volumes of data generated by an assortment of laboratory equipment.

LLE grew out of a four-person team that began fundamental laser research in 1964. The Laboratory for Laser Energetics officially was established in 1970, but did not acquire its own computing facility, a CDC 6600, until October 1977.

Until then, LLE scientists used computers at the Lawrence Livermore Laboratory in California and the Los Alamos Scientific Laboratory in New Mexico. Both have complexes of Control Data equipment.

"But this arrangement was neither convenient, economical nor efficient," Dr. Mosha Lubin, director of the laboratory and a member of the original research team said.

"If we were really serious about contributing to laser technology, attracting industrial supporters and becoming a national users facility — an on-site computing facility was absolutely necessary," he said.



In the target chamber, laser beams are fired to determine their effect on a pellet of deuterium. Instruments measure precisely what occurs during the bombardment, providing enormous volumes of data for processing by the University of Rochester's Laboratory for Laser Energetics' Cyber 175.

Saturated 6600

By the summer of 1979, increased laboratory experiments by both staff and guest researchers had nearly saturated the CDC 6600. It was replaced in November 1979 by a CDC Cyber 175, the second most powerful system in the CDC Cyber 170 Series.

With the Cyber 175, LLE has a computer that is three to five times faster than the CDC 6600 and has a throughput that is up to three times better, a spokesman said.

The new machine has 262,000 words of extended core storage in addition to its basic 198,000 words of central memory and supports eight CDC 844 dual-density disk drives.

Close Ties

Dr. Robert McCory, director of the division of theory at LLE, which uses about 80% of available computing time on the Cyber 175, noted that advances in laser technology are closely tied to increased computer capability.

Laser experiments generate enormous volumes of data. A three-dimensional computer run at LLE can be 10 hours in length and can demand up to 10 tape reels of atomic equations and data base information, a spokesman said.

The 24-beam, 12-trillion watt Omega laser system at LLE is the only high-peak-power laser facility available to users in the U.S. Its capacity allows a firing every 30 minutes for at least 16 hours per day, five days a week, McCory noted.

The laser fusion process involves compressing and heating a minute fuel pellet containing deuterium (a form of hydrogen found in sea water) to temperatures greater than 50 million degrees.

Models and Simulation

In addition to processing data generated by the laser system, LLE also uses the Cyber 175 for modeling and simulations and for impact studies to determine how laser-source energy will impact current energy industries.

"If laser fusion energy release comes close to present expectations — based on experimental results of the last few years — it can begin contributing to the electric power budget of the U.S by the year 2000." Lubin added.

To manage its computer operation, LLE selected Control Data's facilities management services.

Control Data is responsible for computer operations and associated personnel, including analysts, operators and system maintenance engineers.

One of Three

The LLE is one of three major laboratories conducting laser fusion research in this country. The other two are Lawrence Livermore and Los Alamos Scientific.

They are supported entirely by the federal government and are oriented largely toward national defense uses for laser fusion, although they also are interested in energy production.

The LLE is also the only laser research facility devoted to producing energy for commercial use.

Librarians Offered Contract Tutorial

SAN FRANCISCO — "Data Processing Specifications and Contracting" is the title of a regional workshop that will be held by the American Library Association's (ALA) Library and Information Technology Association (Lita) in San Francisco June 24-26 as a preconference institute to the 1981 ALA annual conference.

The "Data Processing Specifications and Contracting" tutorials have been developed to meet the needs of librarians installing or preparing to install varying types of automated systems.

More information and registration forms are available from Lita/ALA, 50 E. Huron St., Chicago, Ill. 60611.

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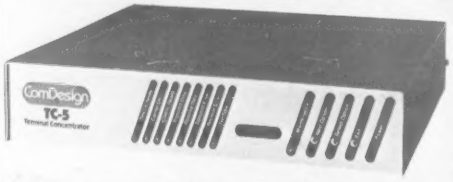

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Choice is our business.

SNA-Based Net

Phone System Net Rings Up Productivity 35%

CHICAGO — Central Telephone & Utilities Corp. (Centel) reportedly increased productivity by 35% and improved customer service after it installed a computer-based communications network that runs the gamut from processing customer orders to remote corporate communications.

The network was created by officials of the nation's fourth-largest independent telephone system in a move designed to strengthen the computer support systems used by both management and operations personnel throughout the company.

Using IBM's Systems Network Architecture (SNA) and the firm's own communications facilities, the network links dispersed data centers at Lincoln, Neb., Charlottesville, Va., and Las Vegas.

"Centel has long leaned heavily on its computer resource, and the companywide network makes that vital resource far more accessible and much more useful to many more people," said Eugene P. Alfonsin, Centel's vice-president of data services.

"Because of the network, any user anywhere has fast, direct access to any computer support program or to any computer data base. Information is available when and where it is needed," he added.

Al Rymarz, customer service manager of Centel's Illinois division, confirmed the new system's many contributions. "Since we began using the on-line mechanized service order (MSO) network, productivity in our service order group has shot up at least 35%.

"Our business office service order typists used to average about 85 orders per day, per person. Now the average is up to 125 orders per day, per person and is still climbing. The productivity gain is apparent all down the line — from the terminal clerk who enters the order to the order proofer to the scheduler to the installer."

MSO was the first application to go on-line. "This was given top priority because the service order is what makes things happen in a telephone company," Alfonsin said.

Six of the 10 states in Centel's service area already are being served by the MSO network system. These include Illinois, which served as the pilot site for the system, Ohio, Minnesota, Virginia, North Carolina and Florida. Network service is to be extended early this year to Centel divisions in Iowa, Missouri and Texas.

Some 400 IBM video display and printer terminals currently are on-line to the MSO network. Located in the business offices and plant departments of the telephone divisions, the terminals are linked by telephone to controllers that interface with an IBM 3033 processor at the Lincoln data center, the company's largest.

Transaction Flow

More than 1.7 million transactions a month flow through the system in support of service order processing. Service order processing is initiated by business office personnel using the on-site video display terminals. Service requests from customers are entered on-line and order details are transmitted to the 3033 computer, which sets up a fresh record on the service order master file.

Previously, the firm had to type the service orders at the originating business office, using a nine-part form. Then, the typed order was distributed to the various work locations and finally sent to the division DP center at either Lincoln, Charlottesville or Las Vegas. "The new system reduces errors, paperwork and eliminates the lost time," officials claim.

The record created on the on-line file as the service order data is entered becomes immediately available to terminal inquiry. As the order is subsequently scheduled, assigned and installed, the file record is continuously updated to reflect its current status.

The system does more than accept, track and report on the status of service orders. Immediately after the service order data is entered and set up on the file record, the computer transmits a copy of the order to the printer terminal at the appropriate plant storeroom.

In addition to alerting the plant storeroom to upcoming equipment needs, the system directs a copy of the service order to the printer terminal at the plant service center. Service center personnel then use their display terminal to enter additional information concerning the order.

Among the SNA software packages Centel is using are the Customer Information Control System (CICS), Information Management System (IMS), Network Control Program (NCP) and the Multi-Systems Network Facility (MSNF).

MSNF furnishes the interface linking the three separate computers into a single communications facility. The other SNA software packages help to channel the daily transactions mix through the network that combines service order processing, service order status inquiries, new program development and testing.

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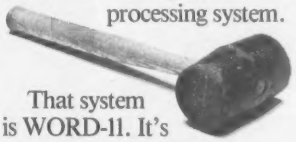

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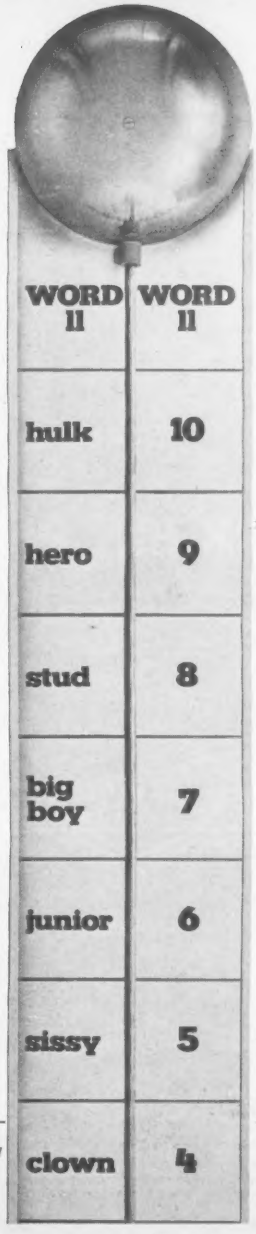

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Runners to Sport Bar Codes in Boston Marathon

BOSTON — What does a package of frozen corn have in common with the 6,000 or so official runners in this year's Boston Marathon?

The answer: Like the corn, the runners will be sporting bar codes similar to the Universal Product Code (UPC) found on food, household and other retail items.

During the race, scheduled to be held on April 20, entrants will be wearing bar code tags to help officials swiftly and accurately tabulate the final results.

As each runner completes the more than 26-mile course, the completion time will be recorded and officials wil collect the bar code tags.

The information on the tag — which basically consists of the runner's number — will then be recorded by one of three bar code readers and merged with the runner's demographics and finishing time. The latter information will be already stored in a Honeywell, Inc. Level 6 computer on loan for the occasion.

The computer will then analyze the race results and produce a wealth of statistics showing each runner how he or she did against others of the same age, height, weight, sex and so forth.

"Within minutes after each runner completes the race, the computer will tell us whether the entrant is 40th, 400th or 4,000th," Tom Cusson, Honeywell's manager of support for technical operations, said. "Even before they leave the Prudential Center area [the finish line], the runners will be able to see their names and order of finish on the printouts that will be posted there."

Honeywell has used the bar code recording technique at other races, including Boston's Bonne Bell National Championship for Women and the Tampa, Fla., Gasparilla Long-Distance Classic, with great results, a spokesman claimed.

In the past, race officials stationed near finish lines had to record manually each runner's usually four-digit number — a particularly hard task, considering the hordes of unofficial runners who usually swell the contestant ranks of races such as Boston's Marathon.

Boston's System

The Level 6 computer that will be used in this year's contest is a Model 47 with 256K words of memory and two 80M-byte mass storage units. It will be linked to a 900 line/min printer, the three bar code readers, and five Honeywell VIP7200 CRT terminals. One of the terminals wil be in the press room to service the scores of reporters from around the country and the world, who usually turn up to cover the much publicized event.

On the same day as the race, thousands of preprinted postcards will be run through the system and imprinted with a number of race-related facts about each individual runner. These will be sent to contestants after the race and contain personal information on finishing time, overall ranking, and the average finishing time for runners in that age group, Cusson pointed out.

"For those who don't get a chance to check the results [that day], the postcard should be just the thing," he noted.

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With 'Mapper' Helper

Baker's In-House System Helps Profits Rise

PHILADELPHIA — Tasty Bakery Co. was running into problems with its business so it added a computer to the ingredients to try and help the cake trade rise.

The company, a diversified supplier of snack cakes and pies founded in 1914 here, recently switched from a batch-oriented mainframe to a Sperry Univac 1100/60 demand-oriented system that runs Mapper software.

The switch to in-house DP eliminated the need to hire two additional programmers and one systems analyst, reduced computer run time and increased the DP department's on-time delivery rate by almost 20%, a company spokesman said.

Recent unexpected downturns in the firm's business made the need for better management reporting even more clear. Management looked to the upgrading of its outmoded computer system to help turn the company around.

To the Limit

Last year the company reached the capacity limits of its IBM 360. "We just ran out of gas. We were working approximately 22 hours per day, five days per week and eight hours every Saturday, Sunday and holiday," according to Louis G. Cummings, manager of data processing.

"The rate at which the department delivered jobs on time to its clients was not good. We were on time about 77% of the time. Acceptable is about 95%. We were pretty far from that goal. We were also experiencing computer breakdowns since the equipment was so old," Cummings said.

Management decided to conduct an audit of its computer needs and hired the services of an outside consultant to help it make its decision. Three companies were considered: IBM, Magnuson Systems Corp. and Sperry Univac.

There were some technical differences among the three. If Tasty had chosen the IBM system, it would have had to have converted first to an interim IBM 370, until the 4341 it needed could be delivered. Magnuson had an IBM plug-compatible machine available for immediate delivery, but it was not a full DP support company, management felt.

Univac, however, provided immediate delivery and offered a full data processing support service, a spokesman said.

Key Selling Point

Another selling point for the Univac 1100/60 was its Mapper software, Cummings noted. "Any system that we looked at could do the job, but the software set this system apart. The 1100 Operating System was fully supported, and with Mapper we could save two programmers."

Mapper is a Univac software package that simplifies the construction of computer programs for the user. It reportedly uses an English-like, user-friendly language to allow executives to create job-specific reports at any time.

With Mapper, the executive can sit down at a terminal and create the report. The executive can extract the data necessary, total it and manipulate it any way needed, Cummings pointed out. The DP department is merely responsible for making the user files available when they are needed.

Order Entry

Tasty's order-entry system was among the first applications to be converted. Since the daily baking production is determined by orders received from distributors and route drivers, accurate knowledge of the number and types of pastries ordered is essential.

Before converting to the 1100/60, entry clerks received orders by phone and recorded them on mark sense sheets. At 11 a.m., the sheets were sent to the DP department and a rough estimate of the numbers and types of orders was produced.

However, there was just no way of projecting correctly so early, Cummings said, and it was only by 4 p.m. that the final figures were submitted to production.

Now the orders come in over the telephone and the clerk enters them directly into the system through prompts on a CRT terminal screen. A senior clerk is responsible for making any changes to the orders, if, for example, a distributor calls in with a correction. The sales department then gives the total figure to the bakery, allowing them to schedule their jobs more accurately and more quickly.

The configuration installed at Tasty Baking includes an 1100/60 Model C2 CPU with 2M bytes of main memory, eight disk drives, six tape units, a 2,000 line/min printer, a card punch and card reader and 42 display terminals.

The terminals are scattered throughout Tasty, with 15 in the order-entry department and 20 in the general-accounting area. Several more are located at Tasty's subsidiary, Phillips & Jacobs, Inc., a graphic arts distribution firm.

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Supermini Aids Scientists in Seismic Analysis

Special to CW

WOODS HOLE, Mass. — Scientists at the Woods Hole Oceanographic Institution here are helping unlock the secrets of the movement of the earth's crust through seismic experiments and data analysis by a superminicomputer system.

Woods Hole, a well-known center for oceanographic research, is an extensive user of computer equipment. The institution uses a Xerox Corp. Sigma 7 computer for general-purpose computing and several shipboard systems from Hewlett-Packard Co. for digitizing and reduction of analog data. In addition, scientists have access to large, batch-processing systems at the National Center for Atmospheric Research (Ncar) in Boulder, Colo.

In 1978, the institution acquired a VAX-11/780 computer from Digital Equipment Corp. to provide time-sharing and local processing of large analytical and modeling programs. According to William S. Little, manager of the Information Processing Center (IPC), the institution looked at all 32-bit minicomputers then available. Besides the VAX-11/780, they included machines from Systems Engineering Laboratories, Prime Computer, Inc. and Interdata, Inc.

"When we tested the VAX system in the spring and early summer of 1978, it ran our East Fourier Transform programs faster than the competition by a factor of two," Little recalled. "The VAX also has the very large address space necessary for seismic and oceanographic modeling programs."

The VAX-11/780 at Woods Hole has 2.5M bytes of main memory, four RP06 disk drives of 176M bytes each, two 75-in./sec. tape drives and 32 time-sharing ports. Eight ports are connected to dial-up communications lines; several more are connected to hard-wired CRT terminals.

Remaining ports support several different types of peripheral equipment, including a California Computer Products, Inc. 1055 plotter, six Tektronix, Inc. graphics terminals, a Summagraphics digitizer tablet and an Imlac 3205 refresh graphics terminal with a light pen. In addition, a Datapoint Corp. Diskette 1100 remote batch terminal, linked to one of the VAX time-sharing ports provides access to the large systems at the Ncar.

Data Analysis

Two major departments at the institution, Geology and Geophysics and Physical Oceanography, use the VAX for modeling and for analysis of data captured by shipboard measuring devices and brought back on magnetic tape by oceangoing research vessels.

The Geology and Geophysics Department studies the structure of the earth's crust beneath the oceans, measuring gravitational attraction along with water depth and using data from seismic refraction experiments. For the latter, Little explained, shipboard researchers detonate underwater explosions, whose sound waves travel through layers of earth at the bottom and are detected by hydrophones on the ocean floor.

Data is captured in analog form on quarter-in. recording tape, transcribed to high-speed analog tape and then converted by the shipboard computers to 9-track digital format. Also captured are time and other "shot-logging" data, water depth and ship's position at the time of the shot.

Tapes are returned to Woods Hole for processing on the VAX. The system corrects errors that crop up during digitization and reduction, runs programs to correct for variations in undersea topography and signal receiver characteristics, brings all shot parameters together in one record and converts measurements to a standard format. Shot parameters and hydrophone data are combined and added to an on-line seismic data base.

"From those signals, scientists can tell the structure of the rock below the bottom of the ocean, and from the properties of that rock they can make judgments about the movement of the earth's crust," Little explained.

Experimental results are compared with synthetic seismograms, constructed by a large numerical modeling program using hypothetical wave velocity and depth data. This is presently the largest analytical project being conducted on the VAX.

Scientists in the Physical Oceanography Department use the VAX-11/780 and large Control Data Corp. 7600 and Cray Research, Inc. Cray-1 systems at Ncar to create models that simulate the dynamic behavior of the earth's oceans, showing the influences of tides, winds and the earth's rotation.

The largest models are run on the Cray-1, a batch-oriented system. Scientists prefer to run small and medium-size models on the VAX, where they can take advantage of time-sharing. Programs and graphics can be transmitted between the two systems, which are connected by a remote batch link.

To study the generation and movement of mid-ocean eddies, scientists build an idealized model of a rectangular, flat-bottomed ocean and apply a driving force such as a cyclonic wind to its surface. Contour plots show patterns of flow after 800 days. Woods Hole physical oceanographers plan to catalog and archive current meter and other data on the VAX system in order to compare experimental results with the models.

Little said much of the VAX application software was written by Woods Hole's IPC programmers or by outside project programmers funded by research grants. Other programs, including the large Fortran programs used in the seismic experiments, were acquired from scientific laboratories throughout the world.

Computers Act As Waiters

VALENCIENNES, France — Talking plastic clowns, giant menus, nude women and roller skates have all been used as gimmicks to lure customers into restaurants. But the electonic age is here, and George Guillaume is taking advantage of it.

Guillaume just installed a computerized ordering system in his Northern France establishment. Instead of a waitress, patrons are faced with a keyboard set into a row carved out of the table. Push a button, and see the menu. Push another button to order drinks from the bar, and yet another to order the entree and so on.

Guillaume, a graduate of France's famed Ecole Polytechnique, said the computerized system is not a gimmick — it is just the only way he can ensure a "satisfactory price-quality ratio." The computer has allowed the restaurant to cut its kitchen staff to two — although Guillaume maintains a seven-waitress staff to seat patrons, he added.

The French Chef (electronic version) has not gone unnoticed. Guillaume said his customers view the ordering system as a new toy. He added his customers seem to be taking well to the new system.

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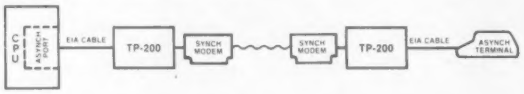

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With Mini, DBMS

Truax Cuts Report Time From 45 Days to Three

CORVALLIS, Ore. — Truax Oil, Inc. here cut sales reporting time from 45 days to about three with help from a minicomputer and a data base management system (DBMS).

The small business computer has also enabled the company to increase the number of gas stations it owns without increasing its clerical staff. But, the biggest computer-related benefit is additional management control because of timely sales data, according to Herb Rowley, vice-president of finance.

"Previously, we had no idea of how monthly sales were going in a particular location until almost six weeks after the month-end closings," he said. "Now we are aware of every aspect of our sales on an almost daily basis. If a station in Eugene, Ore., turns in a series of unusual sales figures, we can send our manager out to correct the problem before it turns into a major loss.

"We are also generating almost 40% more reports on various aspects of our sales, which gives us even more management control," Rowley noted.

Truax, which distributes its products on both retail and wholesale levels, began operation in 1940. Currently consisting of approximately 50 retail gas stations throughout Oregon and Washington, a transportation company that distributes petroleum products to both company-owned and independent stations and several retail auto parts stores, the company is also in the process of developing a chain of convenience stores to complement the retail gas stations.

Truax Oil expects to establish a direct communication link between the computer and the gas pump at stations such as this. The HP 3000 will automatically poll the pumps for sales data and inventory information.

Expansion Pressures

In 1976, Truax purchased two in-house computers and instituted a batch system for its sales and clerical functions. However, by late 1978, it became obvious that the expanding corporation required a more sophisticated computer system.

"We were facing a number of problems," Rowley said, "but the most important was that we knew we were losing money and control because timely sales data was not available to our managers. We asked Data Associates, Inc., a Corvallis-based consulting firm to help us design a system that would solve our immediate problems as well as help meet those that would undoubtedly arise in the future."

"When we began working with Truax, we realized that a DBMS, multilanguage capabilities, easy operation and the ability to expand would be major criteria for whatever computer we selected," David Bowker, president of Data Associates, said.

"Image/3000, the DBMS for Hewlett-Packard Co.'s HP 3000 mini, allowed us to set up eight major interfacing data bases," he noted.

Master Data Base

The master data base, for example, contains all codes, names and addresses of company-owned and independent jobber locations. The sales data base interfaces with the master file and contains the daily operating statistics for each company-owned station. Another system component obtains sales data via telephone directly from the pumps through phone modems in several locations, which it then feeds into the sales data base, Bowker explained.

There are also separate data bases for retail and wholesale pricing, accounts payable, accounts receivable and payroll, all of which interface with the general ledger data base, he said.

Communications features including asynchronous transmission, multipoint and point-to-point environments and dial-up capabilities were the final factors in the choice of the HP 3000.

"Truax eventually wants to automate each location with a direct communications link at every pump," he said.

The sales reporting system begins with raw data received from station operators and two "Kard Gard" locations that feed directly into the data base, a Truax spokesman explained.

Clerks enter data into appropriate files, to accumulate until month-end, he said. However, anyone requiring specific information can access the data base by entering a special query throughout the month, he noted.

To obtain a sales report, a manager enters an identity code and the word "menu" and a list of reports appears with corresponding numerical codes. The code for the desired report is entered, followed by a password, the location and the time span for which the information is required. The computer then prints out a hard-copy report or displays the report on a terminal screen.

The reports are generated on a system consisting of the HP 3000 Series III with 512K bytes of memory with the 10 HP 2640 terminals and two HP 2645A terminals and a Memorex Corp. line printer. Two HP 7925 disk drives with 120M bytes of memory each and an HP 7970E tape drive complete the hardware configuration.

The applications being processed revolve around standard accounting systems and were written in Cobol using the Image/3000 DBMS.

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Inventory Data Base Cuts Airplane Downtime

HOUSTON — Just as a ship lying idle in port can cost its owners thousands of dollars in downtime, so can an airplane sitting on the tarmac become a liability to its owner.

Oftentimes when an aircraft is idled for repairs, valuable flight time is lost as mechanics scramble to find the right part. Now to eliminate long and costly inventory searches before a plane can get off the ground, a plane parts inventory service with access to parts suppliers across the country is up and running.

Developed by the Inventory Locator Service, Inc. (ILS) of Memphis, Tenn., and Texas Instruments, Inc., the system collects and combines the inventories from many suppliers of new and used aircraft parts and support items. The pooled information is stored in the ILS central host mainframe data bank, which inventories over one million parts.

In addition the service, using Texas Instruments Silent 700 Model 765 Portable Bubble Memory Data Terminal, records the quantity of each available part and the telephone number of the company listing the part. Parts are referenced by part number, model number and description. Each participating company is supplied with a data terminal.

Batch Transmission

With bubble memory, time-consuming data entries can be made prior to the phone connection and stored for later batch transmission to the parts data base maintained by ILS, the company said. The Texas Instruments bubble memory is capable of storing 20,000 char. of data, with an optional expansion of up to 80,000 char., the company said.

Aircraft purchasing agents formerly had to place emergency orders by phone to several supply companies as the parts were needed, calling until the part was found. The data terminal now puts them in touch with the combined inventories of a host of suppliers, the company said.

To obtain the needed information on parts availability, the parts manager places a standard phone call to the host computer, which then locates the part. The information is then transmitted back to the customer and printed onto the CRT terminal at the manager's desk.

"In any service-oriented industry, downtime is crucial and costly," said Minnie Ash, ILS president. "In the airline industry, it is especially difficult to estimate how many dollars are lost each time a plane is grounded. For the purchasing agent, it is like classified advertising, but the terminal does the looking much faster."

"With the acoustic coupler, ILS pays only for the time it takes to electronically transmit data over normal phone lines," Ash added. "That is a lot less costly than verbally relaying the information several times over the telephone to several different companies. ILS users are able to realize additional savings because of the terminal's off-line data entry and nonvolatile bubble memory data storage capabilities."

"We've saved time and money," said Gary Rafalowski of Technical Services International, Inc. of Miami. "And we've found new supply contacts we never knew about before."

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Fee: $225. Registration deadline is May 15.

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'Mumps' Cures Project Management Ills

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WHITE PLAINS, N.Y. — An English-language data base management information and reporting system is reportedly providing more project management information and faster accounting data for the environmental consulting engineering firm of Malcolm Pirnie, Inc. here.

This company specializes in water treatment and distribution systems, as well as facilities for industrial and municipal waste-water treatment. It also is part of Amcheng, a consortium of three companies in the field formed to provide environmental services to the People's Republic of China.

Prior to installing the system, the company used its service bureau's batch-oriented system for management reports, accounts payable and project cost-accounting. That system began in 1972 when the company consisted of 250 employees. With its growth to over 400 employees, its needs for project and accounting information have increased steadily.

Projects had become smaller, but more numerous, requiring faster and more frequent project reporting. The service bureau needed 10 days to turn around end-of-the-month data. In addition, the data was handled more than once in the course of processing, which doubled and sometimes tripled the work.

In-House System

Management began to examine the possibility of installing an in-house system that would incorporate payables, receivables, general ledger and project reporting, including personnel management. They reviewed the available literature, contacted other engineering firms to determine how they met their business-computer needs and developed a list of system requirements.

It soon became apparent that a software system would have to be designed to meet the company's individual specifications. Because of its need for a large data base, a computer language that rapidly could access a sizable file structure was essential. Because many people without computer training would be using the system, the language had to be simple to use and easy to learn.

Fortran and Cobol did not meet these requirements. A data base language called Mumps was the company's final choice. Originally developed for Massachusetts General Hospital, Mumps is reportedly widely used in large database retrieval.

Vista Computer, Inc., which had experience with business computer applications of Mumps, developed a proposal for an in-house system based on Mumps.

Vista agreed to develop a personnel system for Malcolm Pirnie on a time-sharing basis, with rented equipment, so the company could evaluate the success of the project on a smaller scale. Programming began in March 1979. Less than three months later, Malcolm Pirnie accepted the personnel system.

For every project, the system enables the company to keep track of every hour of every employee and every expenditure by department, office and region. It can provide instant access to information by transaction (hour or expense charge), employee group, responsibility center (work-in-process or accounting), region, job and company.

Previously, this information took two to three days to assemble. With the system, completed reports are prepared in half an hour. New reports can be created whenever needed by even nonprogrammers. Whereas, using the old system, it required a man-month's time to prepare revenue-recognition computations, the Vista system takes just a half hour.

Security is provided via the use of passwords that restrict information to the appropriate level of management.

The hardware used in the Vista system includes a Data General Corp. S140 with 25K bytes of main memory and 160M-byte disks, nine terminals and a 300 line/min printer.

Prepublication Prices Available for Survey

NEW YORK — Results of a survey conducted in January by the Institute of Electrical and Electronics Engineers, Inc. (IEEE), called the IEEE 1981 U.S. Membership Salary and Fringe Benefit Survey, will be available at prepublication prices for orders made on or before June 8.

The survey questionnaire, which was mailed to a sample of IEEE members, senior members and fellows in the U.S., solicited responses on such areas as job function, supervisory responsibility, type of employer, company size and geographic location.

The prepublication price for IEEE members is $39 and $52 for nonmembers. After June 8, the price goes up to $45 for members and $60 for nonmembers, with an additional $2 billing charge. Send orders to IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.

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BYTE the small systems journal

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Calendar

April 29, Washington, D.C. — **Files and Formatting.** Contact: STSC, Inc., Suite 1414, 7101 Wisconsin Ave., Bethesda, Md. 20014. Also being held April 30, Philadelphia and Atlanta.

April 30-May 1, San Francisco — **Distributed Data Processing Technology.** Contact: Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

April 30-May 1, Saddle Brook, N.J. — **An Assessment and Forecast of Computer Graphics.** Contact: Bob Sullivan, Inc., 1606 Fulton St., New York, N.Y. 10038.

May 4, Boston — **Telecommunications Trends and Developments in 1981.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

May 4-5, Los Angeles — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

May 4-5, Cherry Hill, N.J. — **Selecting and Using Computer Data Entry.** Contact: Carol Bell, MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

May 4-5, Washington, D.C. — **Data Base Concepts.** Contact: Stephanie Gaubatz, RHY Consultants, 1444 Balsam St., St. Paul, Minn. 55122.

May 4-6, Dallas — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held May 4-6 in Boston.

May 4-6, Short Hills, N.J. — **Data Processing for the Non-DP Executive.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

May 4-6, Atlanta — **Introduction to Data Communications.** Contact: Systems Technology Forum, Inc., 8991 Cotswold Drive, Burke, Va. 22015. Also being held May 6-8 in Washington, May 13-15 in Chicago and May 20-22 in San Francisco and Boston.

May 4-6, Palo Alto, Calif. — **Digital Control.** Contact: Hellman Associates, 299 S. California Ave., Palo Alto, Calif. 94306.

May 4-7, Boston — **Structured Programming: Techniques for Productivity.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181. Also being held May 12-15 in Arlington, Texas.

May 4-7, Chicago — **1981 National Computer Conference.** Contact: American Federation of Information Processing Societies, Inc., P.O. Box 9658, 1815 N. Lynn St., Arlington, Va. 22209.

May 4-7, Kansas City, Mo. — **Structured Systems Design.** Contact: Ken Orr & Associates, Inc., 715 E. 8, Topeka, Kan. 66607.

May 4-8, Chicago — **Systematic Software and Design and Analysis.** Contact: Eduteach, Inc., Suite 907, 162 N. State St., Chicago, Ill. 60601.

May 4-8, Naperville, Ill. — **Data Base Design With IDMS.** Contact: DBMS, Inc., 33 W. Roosevelt, Lombard, Ill. 60148.

May 4-8, Washington, D.C. — **Comparative Data Base Management Systems.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

May 4-8, New York City — **Eleventh Conference on Computer Audit, Control and Security.** Contact: Registrar, EDP Auditors Foundation, P.O. Box 2051, Winter Park, Fla. 32790.

May 4-8, Washington, D.C. — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 11-15 in Houston and Los Angeles and May 18-22 in Minneapolis and Wilmington, Mass.

May 4-8, Toronto — **Advanced Structured Analysis: Logical Modeling Workshop.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 11-15 in New York and May 18-22 in Chicago and Phoenix.

May 4-8, Dallas — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 11-15 in Atlanta and New York and May 18-22 in Chicago.

May 4-8, Madison, Wis. — **Finite Element Concepts: Modeling Methods and Applications.** Contact: John M. Leaman, Program Director, Engineering Department, University of Wisconsin-Extension, 929 N. 6 St., Milwaukee, Wis. 53203.

May 4-8, Chicago — **Computer Systems Design.** Contact: Registrar, Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

May 4-22, St. Charles, Ill. — **Computer Fundamentals.** Contact: Registrar, Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

May 5, Boston — **Major Mistakes in Communications Management and How to Avoid Them.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521. Also being held May 6 in Washington, D.C., May 20 in Los Angeles and May 21 in San Francisco.

May 5, Washington, D.C. — **Telecommunications Trends and Developments in 1981.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521. Also being held May 18 in San Francisco and May 19 in Los Angeles.

May 5-6, N. Jersey, N.J. — **A Systems Approach to Project Documentation.** Contact: Registrar, Carnegie Press, 100 Kings Road, Madison, N.J. 07940.

May 5-7, Washington, D.C. — **EFT Strategies in a Dynamic Multiindustry Environment.** Contact: Electronic Funds Transfer Association, Suite 800, 1029 Vermont Ave., N.W. Washington, D.C. 20005.

May 5-7, Washington, D.C. — **Paperwork Reduction Act of 1980.** Contact: Department N, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

May 5-7, Winston-Salem, N.C. — **Users of Arista Manufacturing Systems.** Contact: Al Loebel, Harris Corp., Melbourne, Fla. 32919.

May 5-7, Brussels — **Compec Europe.** Contact: The Exhibition Manager, Compec Europe, LPC Exhibitions Ltd., 40 Bowling Green Lane, London EC1R One, England.

May 5-8, Philadelphia — **Power Industry Computer Applications '81 Conference.** Contact: T.A. Suman, Philadelphia Electric Co., 2301 Market St., N3-1, Philadelphia, Pa. 19101.

May 5-8, Kansas City, Mo. — **Structured Systems Design.** Contact: Ken Orr and Associates, Inc., 715 E. 8, Topeka, Kan. 66607.

May 6, Bellevue, Wash. — **Automated Mapping Seminar.** Contact: Kellogg Corp., 5601 S. Broadway, Littleton, Colo. 80121.

May 6-7, Los Angeles — **Financial Analysis for Telecommunications Professionals.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521. Also being held May 11-12 in Nashville, Tenn.

May 6-8, Washington, D.C. — **Audit and Control in the Data Base Environment.** Contact: Stephanie Gaubatz, RHY Consultants, 1444 Balsam St., St. Paul, Minn. 55122.

May 6-7, Seattle — **SAS Two-Day Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

May 6-8, Boston — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 6-8, Las Vegas — **Independent Computer Consultants Association '81.** Contact: ICCA '81, P.O. Box 772, Bartlesville, Okla. 74003

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Calendar

May 7, New York — **Politics in Data Processing.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

May 7, Milwaukee — **Teaching New Technology.** Contact: Steve Deam, Business Division, Milwaukee Area Technical College, 1015 N. 6 St., Milwaukee, Wis. 53203.

May 7-8, Boston — **Managing Software Projects in Government and Industry.** Contact: Data Processing Management Association Education Foundation, P.O. Box 91295, Department MSP, Los Angeles, Calif. 90009. Also being held May 14-15 in Palm Beach, Fla., and May 21-22 in Washington, D.C.

May 7-8, Midland, Mich — **Eighth-Annual Computer Show.** Contact: Richard Premo, Data Processing Management Association, Saginaw Valley Chapter, University Center, Mich. 48710.

May 8, Chicago — **OCLC: Present and Future — The User's Perspective.** Contact: Adrian Jones, Office of the Director of Libraries, Roosevelt University, 430 S. Michigan Ave., Chicago, Ill. 60605.

May 7-8, Atlanta — **DP For Users.** Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151. Also being held in Dallas, May 18-19 and Hartford, May 28-29.

May 10-13, Las Vegas — **Association for Systems Management Annual Conference.** Contact: Richard B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

May 11, New York — **Telecommunications in the United Kingdom.** Contact: Bobbie Cooper, marketing administrator, Telecom Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009. Also being held May 12 in Toronto, May 13 in Chicago, May 15 in Houston and May 8 in San Francisco.

May 11, New York — **Systems Evaluation Approach: Documentation of Controls.** Contact: EDP Auditors Association, Inc., G.P.O. Box 1279, New York, N.Y. 10116.

May 11-12, Washington, D.C. — **Managing Documentation and Documentation Standards.** Contact: T. Jess Seiple, 100 Kings Road, Madison, N.J. 07940. Also being held May 14-15 in Chicago.

May 11-12, Williamsburg, Va., — **Communications Technology Trends.** Contact: Systems Technology Forum, 8991 Cotswold Drive, Burke, Va. 22015

May 11-13, New York — **Computer-Based Micrographic Retrieval Systems.** Contact: American Management Association, 135 W. 50 St., New York, N.Y. 10020.

May 11-3, Chicago — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held May 18-20 in San Francisco.

May 11-13, Washington, D.C. — **Introduction to Teleprocessing Software.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held May 18-20 in Chicago.

May 11-13, Chicago — **Effective Computer Operations Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held May 18-20 in Denver.

May 11-13, San Francisco — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held May 18-20 in Washington, D.C.

May 11-13, New York — **Effective Oral Presentation Techniques for DP Professionals**. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 11-13, Los Angeles — **Developing Automated Human Resource Management Systems.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

May 11-13, Houston — **DL/1 Application Programming.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

May 11-13, New York — **SNA.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

May 11-13, San Francisco — **Managing the Data Base Environment.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

May 11-13, Detroit — **Project Leadership Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

May 11-13, Louisville, Ky. — **Compufest '81.** Contact: CPA Society, 310 W. Liberty St., Louisville, Ky. 40202.

May 11-13, Los Angeles — **Advances in Computer Technology: A User and Management View.** Contact: Department of Management and Business, UCLA Extension, P.O. Box 24901, Los Angeles, Calif. 90024.

May 11-14, Washington, D.C. — **IMS/VS Application Development Facility.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

May 11-15, Boston — **Systems Workshop II.** Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

May 11-15, Annapolis, Md. — **How to Achieve User Satisfaction in the Delivery of Computer Services.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

May 11-15, Philadelphia — **Structured Design and Programming Workshop.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 18-22 in St. Louis.

May 11-15, Miami — **Structured Design Workshop.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held in Nashua, May 11-15 and San Francisco, May 18-22.

May 11-15, Houston — **Structured Programming Workshop In Cobol.** Contact: Yourdon, Inc., Suite 3830, 1133 Ave. of the Americas, New York, N.Y. 10036.

May 11-15, Toronto — **SSD/SPD Combined Course.** Contact: Ken Orr and Associates, Inc., 715 E. 8, Topeka, Kans. 66607.

May 11-15, Chicago — **Project Planning; Management and Control Workshop.** Contact: Eduteach, Inc., Suite 907, 162 N. State St., Chicago, Ill. 60601.

May 11-15, Los Angeles — **Applied Interactive Computer Graphics.** Contact: Continuing Education in Engineering and Mathematics, UCLA Extension, P.O. Box 24902, Los Angeles, Calif. 90024.

May 12-13, Washington, D.C. — **Local Networks.** Contact: Anita Greenberg, Telestrategies, Inc., Suite 102, 6842 Elm St., McLean, Va. 22101.

May 12-13, Raleigh, N.C. — **SAS Advanced Input/Output Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

May 12-13, Chicago — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521. Also being held May 19-20 in Washington, D.C.

May 13-15, Los Angeles — **IBM 4300 Series.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049. Also being held May 20-22 in Boston.

May 13-15, Boston — **Distributed Systems: Effective Approaches and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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Minister Wholly in Favor of MPU Mailing Aid

ALHAMBRA, Calif. — A minister here is blessing his microcomputer for making it possible for him to support a leap from a local congregation of 200 families to a nationwide audience of an estimated 750,000.

Rev. Ian Robertson of the Alhambra Church of the Nazarene came to his 60-year-old suburban Los Angeles congregation at a time when church membership stood at 200 families. One year ago, he began a religious program on three television stations in Los Angeles and San Francisco; now the program is beamed by satellite to 300 cable TV stations in 39 states and is reaching a viewing audience estimated at three-quarters of a million people.

The half-hour magazine format show is made up of music, interviews and a brief message from the pastor. Recalling the success of the fisherman of Galilee, Robertson titled his program "NetWork."

When the possibility of the television program first came up, Robertson realized that the volume of mailings needed to produce the income required to sustain such a series would be too great to be handled by church volunteers. Robertson heard about low-cost microcomputers from members of his congregation and thought they might offer an answer to the mailing problem.

And they have. The size of the mailing list and the volume of letters that go out to each viewer who writes in make this kind of effort unmanageable without a computer, according to the minister.

"Our mailing list increased from 500 to 5,000 in the first six months," he said. "And I wouldn't be surprised if the number reaches 20,000 after a few months on the satellite."

Selecting a System

Robertson tried to tackle the problem of selecting a suitable system by asking other ministers, but could not find any who had yet explored the world of computers. He next tried working with a system belonging to one of his parishioners, but it proved unsatisfactory because it took much too long to sort a mailing list.

A computer trade show in nearby Los Angeles offered an opportunity to look over the entire line of small business systems. It seemed that equipment from Vector Graphics, Inc. might provide the needed capacity, word processing software, capability to sort and process a large mailing list and ability to merge text with the mailing list for personalized letters.

Moreover, "I'm a Scotsman," Robertson said, "and this looked like a bargain. The cost of the microcomputer with the peripheral equipment and programs we needed was about $8,000."

To ensure that his decision was sound, he arranged to try out the Vector Graphics at the dealership in his area, Personalized Computer Systems in Arcadia, Calif. It was an unusual arrangement, but the minister spent hours working with the system, took the manual home to study overnight and brought in typical projects to run.

Within a month, according to the dealer, Robertson had taught himself how to use the computer and had become convinced that it would be suitable.

The equipment he chose consists of the Vector Graphics System B, which is a desktop microcomputer built around a CRT screen. The microcomputer incorporates random-access storage memory for 56K bytes of computer data. In addition, two "floppy disk" drives provide storage for 630,000 characters that the computer draws on as needed. The Vector Graphics micro computer he selected also includes a high-speed, letter-quality printer.

Robertson found uses for his microcomputer that he had not anticipated before acquiring it. He produces the church's monthly 16-page magazine by first writing the copy in draft form directly on the Vector terminal. After he makes his own corrections, the copy is edited and put into finished form by his secretary, who selects type styles and sizes and prepares a layout.

Formerly, the copy would be hand-carried to the typesetter. Now, however, the secretary places a phone call to the typesetter and feeds the newsletter copy automatically over the phone directly to the print shop's computer, which sets the type in reproduction form.

The microcomputer is also used to prepare the quarterly Sunday School class records.

Rev. Robertson and assistant Diane Hernandez check out fund-raising letters on the Vector Graphics system.

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BY GIRISH PARIKH

How to Measure Programmer Productivity

Programmer productivity has become one of the key issues in data processing. It is becoming more critical as hardware costs plummet and software (especially programming) costs skyrocket.

A recent article in *Computerworld* by J. Daniel Couger [CW, Dec. 1] put it dramaticaliy: "What is the time comparison for writing vs. processing a programming instruction?" The ratio of processing to coding is more than 100 million to one!

The issues of programmer productivity and its measurement have also become important as the emerging and now rapidly spreading structured technologies (structured programming, structured design, structured analysis and the related productivity techniques) claim to improve programmer productivity in development as well as in maintenance.

But how much productivity is increased and against what? Percentage increases do not make much sense, and increases in lines of code per day are meaningless unless qualified, as we shall see later. On most projects, no historical data has been kept — so there is no past data against which to compare.

Unless we have systematic methods to measure programmer productivity, "productivity" becomes merely a buzzword. What exactly do we mean by programmer productivity? And how do we measure it?

Programmer productivity is generally defined as the quantity of work produced by an individual programmer in a unit of time. The definition implies the speed of programming, including the related tasks such as program design, coding, testing and documentation. The definition can be modified to use an expense or cost unit instead of work unit. In addition, the definition should be extended to include program quality measurements.

The quantity and quality measurements of programmer productivity can be integrated using programmer productivity metrics, as we shall see later.

Managers need quantity and quality measurements of a programmer's output for several reasons, among them the following:

1) To assure that the company is getting its money's worth.

2) To appraise and reward a programmer properly.

3) To estimate programming resources for scheduling a project.

Programmers, too, should be aware of their productivity. By being objective and evaluating themselves, they get to know their true worth. A person may intuitively know how good or bad he is, but the productivity data may speak louder.

Units of Measurement

For measuring programmer productivity, we need units of measurement. The most commonly used are work units. Cost units have been proposed as a better alternative by T.C. Jones in his numerous articles (see, for instance, "Measuring Programming Quality and Productivity," *IBM Systems Journal*, Volume 17, No. 1, 1978). However, it seems they are not widely used.

Work units generally measure the speed of programming. Examples of work units are lines of code (LOC) per

(Continued on Page 56)

The article is based on the report "How to Measure Programmer Productivity" by Girish Parikh to be published in the series "Programmer Productivity Reports" by Shetal Enterprises, 1787 B W. Touhy, Chicago, Ill. 60626. The 15,000-word report will be available in May and can be ordered from the publisher for $20.

IN DEPTH

(Continued from Page 55)

programmer-day, documentation pages per documenter-month, CPU hours per programmer-month and test casts developed and executed per programmer-month.

The most common unit is LOC per programmer-day. Since the final product of a programmer's work is a working program, the ratio of lines of code produced and time expended may indicate his productivity.

However, there are several problems with this unit. For example, what does LOC mean? Does it mean all the lines a programmer coded during the development of a program (including the throwaway code, if any, and the code that was added, changed or deleted because of specification changes), or just the lines in the final product? Does it include data definitions and comments, or just the executable statements?

Unless LOC is precisely defined, productivity measurements do not make much sense, and productivity comparisons are misleading.

Comparisons Difficult

Work units, though widely used, are paradoxical and even misleading. For instance, LOC per programmer-day penalizes high-level languages, such as Cobol, and favors the lower level languages, such as BAL, making it harder to compare productivity from program to program and between programmers.

I recall one large project in a major midwestern corporation that used Cobol and BAL. The project manager tried to spur on a Cobol programmer by telling him about the productivity of a BAL programmer.

"Look, your buddy is producing 84 lines per day!" the manager said.

"But he programs in BAL," the Cobol programmer reacted sharply. Naturally, he was turned off!

Similarly, the work units of program quality measurements, such as cost per defect, favor older methods of software development. Consequently they delay the acceptance of modern methods.

Thus, work units should be used cautiously — and with precise definitions.

Cost Units

Units for measuring programming cost concern themselves chiefly with the central product (for example, 1,000 lines of a program), not the human activities that go into developing it.

The following are examples of cost units: programmer-days required per 1,000 LOC; CPU hours per 1,000 LOC; cost per documentage page; cost per defect for maintenance.

Because of inflation, the costs per unit do not remain stable for a long period. Perhaps it would be better to estimate effort in man-hours or man-days necessary for different activities to complete a unit of work. Then, based on the current programming rates, the cost per 1,000 lines can be worked out to get cost estimates.

Measurement by Function

With the advent of structured technologies, especially with the function-driven approaches, function may become a basic unit of the system or program. With progress in these methodologies, it may be possible to estimate the effort needed to design a function. After the (logical) design, the coding and testing effort can be estimated depending on the language used.

For most of the common functions, reusable code may be available. For others, effort can be estimated using tables on productivity (containing data such as type of function, effort needed and a language factor) developed from

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past experience.

LOC data, with proper qualifications, for each function may also be collected and included in the table. Such tables, built and updated over time with estimates and actual experience, may prove to be valuable references.

External Documentation

External documentation (as opposed to "internal" documentation, or comments within a program), is an important programmer job function. A program is *not* considered complete until it is documented. How do you measure programmer productivity in documentation?

In work units, the unit is documentation pages per unit of time. In cost units, it's cost per documentation page. However, cost per page will be lowest for documentation pages with more white space. Generally cost goes down with a greater number of pages. The cost per page is not a good unit since it penalizes compact, tightly written documents, as the cost per page is more compared with that for longer documents; however, the total cost may be less. Thus, cost for documenting 1,000 lines of code may prove to be a better unit.

Effort needed to document 1,000 lines of code may prove to be a relatively stable unit of measure for a particular language, application and programmer.

Programmer Productivity Metrics

Programmer productivity metrics integrates quantity and quality measurements and can be used with the consensus of programmers. The metrics can be used for individual programmers or for a team. The productivity (or productivity index [PI], if you will) will be more comprehensive than any single measure, such as LOC. However, several attributes in the metrics are subjective and need the judgment of more than one expert in calculating average ratings.

Programmer productivity metrics (see figure) is based on the Multi-Element Component Comparison and Analysis method (Mecca) originally developed by Tom Gilb, an independent consultant based in Kolbotn, Norway, and explained in his book *Software Metrics* and in *Ethnotechnical Review Handbook* (Ethnotech, Inc., Lincoln, Neb.) by Daniel P. Freedman and Gerald M. Weinberg.

The metrics approach, I believe, can be used for comparing the quantitative and qualitative elements of programmer productivity — either for an individual or for a team — and a "productivity index" can be worked out. Such an index can be used for comparison with other teams in the same organization — if the method is standardized and well documented. It could also be used to compare performances of programmers and teams from different organizations.

When using such merits, details should be worked out, and the basis for assigning weights, best values, planned values and so forth should be documented. Such metrics models can also be set up for measuring maintenance programming productivity.

Productivity in Design

Programmers are normally responsible for designing a program from specifications. How do you measure their productivity in designing?

Design productivity depends upon many factors, such as the quality of specifications, the tools used (such as Warnier/Orr diagrams, Hipo), the complexity of the functions, guidelines and standards, individual abilities and management attitude and constraints.

Using cost units, the cost for designing a unit of lines (such as 1,000 lines) can be determined. Designing costs may be different for different parts of a program, depending upon varying complexity. For a large program, the costs of overall design can be distributed equally and added to the cost of designing its parts, each comprising unit number of lines.

Here is a "rule of thumb" for measuring programmer productivity in designing, based on work units. First, decide on a unit of measure based on the design tool used — for example, for Hipo, the "function-box"; for pseudocode, the number of lines; for a Warnier-Orr diagram, the number of braces. If Hipo is the design tool, the productivity can be measured as follows.

The number of completed function-boxes per day in a hierarchy chart may be a rule-of-thumb measure of system and program designers' productivity. However, remember that many factors are involved in the design, such as complexity of the system or program, support of the users and quality and completeness of specifications. The measurement and comparison of design personnel's productivity in different situations may not be accurate. Use this method with great caution.

Such a unit of measure may encourage creating more boxes, so some standard, such as equating each box to an average of 50 lines of structured code, might be established.

Experimentation with this unit of measure in a particular environment may lead to some useful results.

Productivity in Maintenance

In a maintenance environment, it is usually extremely difficult to measure productivity. Here are some suggested guidelines.

Number of requests handled by a programmer. Number of change requests handled by a programmer (or a team) in a period of time may indicate productivity. However, some change requests may be big and complex, while others are simple. Complexity and magnitude factors can be used to come up with the units of maintenance work done. Also, number of lines added, deleted and changed for an assignment can be recorded to assess productivity.

Lines of code maintained by a programmer. The number of LOC maintained by a programmer can roughly indicate the maintenance programmer's productivity. However, this measure depends upon the structure of the system, programs and documentation. The programmer's experience and application knowledge may also be a factor.

For a well-documented, reliable software package, a large number of LOC (if source code is supplied) can be maintained by one programmer. The

(Continued on Page 58)

CHARACTERISTICS OF ATTRIBUTE / NAME OF ATTRIBUTE	METRIC UNITS	BEST VALUE (no value for better) / PLANNED (quite satisfactory) / % WEIGHT / MORE IMPORTANT THAN	REMARKS OR REFERENCES
Quantity of Work	Lines of code per day		
Errors found during inspections	Errors per 1,000 lines of code		
Defects found during the first month of production	Error per 1,000 lines of code		
Documentation Quality	Grade points: 7 for best 1 for worst		
Compilations of program(s)	Number of compilations		
Core used by program(s)	k bytes		
Execution speed of program(s)	Seconds or minutes		
Program(s) completed within time schedule	7 for before schedule 1 for very late		
Program(s) completed within budget	7 for less than budget 1 for budget exceeded		
Requirements were met	7 for totally satisfactory 1 for unsatisfactory		
Number of statements in program(s)	Number		
Maintainability of program(s)	7 for maintainable 1 for unmaintainable		

Sample of Programmer Productivity Metrics

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IN DEPTH

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same would be the case with systems software. If vendor support is adequate, a programmer can handle considerable LOC. In contrast, the applications software, if unreliable and poorly documented, would be hard to maintain, and the number of lines of code maintained by a person would decline drastically.

Bebugging technique. Bebugging means artificial insemination of bugs in a program. The time taken by a programmer to correct a bebugged program may indicate his productivity. (Productivity of different maintenance programmers can also be compared.) The technique can be extended to measure productivity in enhancing a program. After an enhancement assignment is completed, the same program (before enhancement) can be given to another programmer to do the same assignment. The time he takes may indicate productivity.

Breakdown of an assignment into required functions. Breaking down an assignment into required functions, then estimating time required for each function and keeping track of the time spent for each function may give some idea about productivity. Time required can be reasonably estimated, based on experience, for routine functions, such as getting a dump of a file, updating the documentation after completing a maintenance assignment, testing a job or job streams. They could be like constant functions — not all constant functions identified will be necessary for a particular assignment, but guidelines can be developed for all such functions once they are identified.

Examples of variable functions include diagnosing the problem and locating the place in the program where changes should be made. A technically oriented manager may be able to qualitatively assess the productivity of a programmer, based on his experience and knowledge of the system. However, such assessment may not be accurate and objective, since each problem may be different. The comparison of programmers for such activities may be inaccurate and unjustified.

Programmer productivity also depends upon "structuredness" and the quality of documentation of a system or program.

Maintenance Functions

The following is a list of functions (excerpted from *Techniques of Program and System Maintenance*, edited by the author and published by Ethnotech, Inc.) into which a maintenance assignment can be broken down. The list is not complete. But it can also be used for estimating and then as a checklist for the work on a maintenance assignment. The following steps may not all be necessary for every assignment.

1. Review the requirements or specifications of the assignment.
2. Talk with the involved persons, such as an analyst, user or the boss. This may be a continuous function throughout the assignment.
3. Take an inventory of the affected program and documentation.
4. Investigate the affected program.
5. Locate the spots in the program where changes should be made.
6. Check the side effects of the proposed program changes on the other parts of the program.
7. Code the changes. Have them keypunched and verified.
8. Make the changes and get a clean compile.
9. Walk through the changes marked in the program. This can also be done after coding the changes.
10. Create test data, if not available.
11. Set up test JCL, if not available.
12. Test the program.
13. Do the system test, if necessary.

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14. Review the results.
15. Move the program to production.
16. Update the affected documentation.
17. Conduct posttest reviews.

Future Directions

A news item titled "Beyond Measuring Lines of Code, New Gauges of Programmer Productivity Set" [CW, July 28] summarized the talk on programmer productivity given by T.C. Jones to the New England Productivity Information Exchange Round Table and indicated some future directions in programmer productivity measurements.

More attention should be paid to the design and analysis stages of program development and measuring the benefits user departments obtain from software.

According to Jones, two methods of measuring productivity across languages, though not yet widely used, are attracting more and more attention: Halstead metrics and functions metrics.

"Instead of lines of code, Halstead metrics, now widely experimented with at universities, counts the number of action statements (operators) and data elements (operands) in a program.

"Experimentation has found there is a correlation between the sum of number of operators and operands in the error rate and productivity of a program. Larger companies such as IBM and ITT are experimenting with the method.

"Function metrics, also under study by IBM, attempts to quantify the cost per function rather than lines of code and assign a benefit to the function."

The author feels that in the future, mathematical methods of productivity measurements, such as Halstead metrics and function metrics, may become popular. However, he feels that, in the functional method, effort per function may be used instead of cost per function. Using effort instead of cost would give relatively stable figures, since cost figures change with inflation and rising programming costs.

Even tables for the effort needed for different programming functions and standard functions (or function integration using reusable code) within a program for a semiskilled to skilled programmer may be developed for estimating purposes. The costs can then be extended using the programming rates.

Programmer productivity metrics may also be used. The lines-of-code methods of measurements will continue to be used, but the line counting rules will be defined and published with the productivity data, to make it meaningful. Research may continue with this method also.

Using the guidelines presented here, management can develop a method of productivity measurement. There is no one perfect method. Several approaches are available and evolving.

Being a human activity, programming may not be measurable with mathematical accuracy. There are just too many factors affecting productivity. However, systematic methods can allow reasonable assessments of productivity, and as methods are refined, accuracy will improve.

Girish Parikh is president of Shetal Enterprises, a Chicago-based consulting firm specializing in software maintenance and structured technologies.

He is the editor of "Programmer Productivity Reports" and "Software Maintenance Newsletter" and is the author of the book Techniques of Program and System Maintenance *(published by Ethnotech, Inc.).*

Parikh has a B.E. degree in civil engineering from Gujarat University, India.

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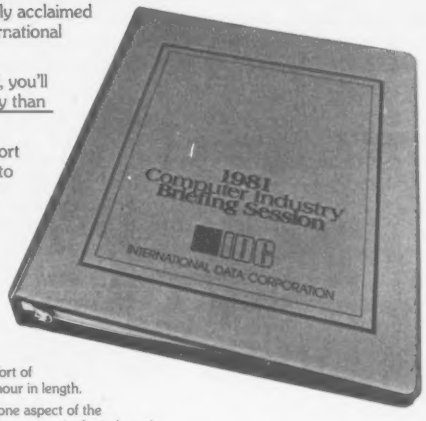

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EDITORIAL

Unions: Whose Agents?

In coming years, trade unions in a number of countries may have to decide their relation to DP professionals. Should DPers unionize? If so, *how* should they unionize — by the industry they serve or as an industry of their own?

DP professionals are critical to many operations of commerce and government, so a union might well become stronger by adding DPers to its ranks.

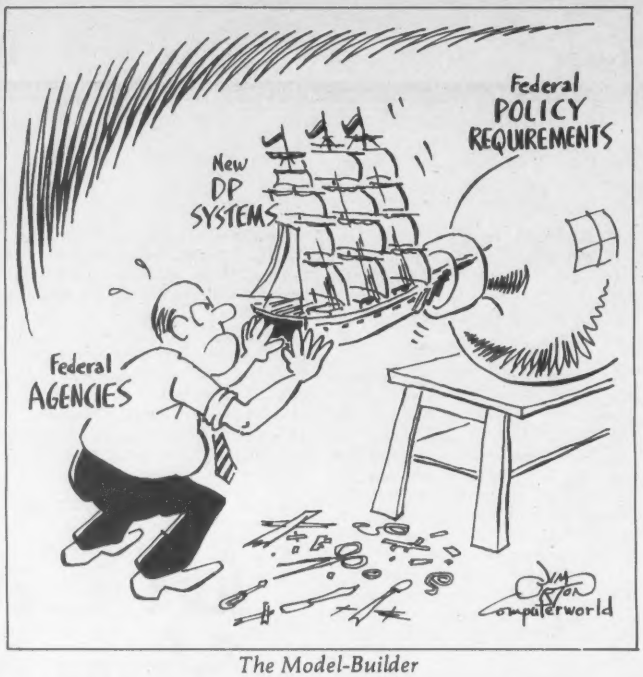
Workers generally form unions when they feel exploited or threatened and that they lack an alternative means of forcing improvements in their situation. Accustomed to fast-growing salary rates and high demand by employers, U.S. DPers have so far shown little interest in unionization, although some existing unions — typically comprised of clerical workers — have tried to incorporate DPers during the past year [CW, Aug. 18, Feb. 23].

But DP professionals in a number of foreign nations have unionized. A strike of British civil servants, many of them DPers, has at times crippled vital government operations in the UK [CW, March 16] while Poland's DP union has reportedly joined other Polish workers in protests and strikes that risk military intervention by the Soviet Union [CW, March 30].

According to an informed observer, countries in the Soviet bloc generally identify DP workers with the industry they support — automobile manufacturing, for example. The Soviet Union lacks journals for computer professionals as such, this observer noted, but has publications for specific applications of computing or dealing with automation generally. Typically, computing specialists are regarded as engineers or mathematicians who happen to be experts in use of computers.

End user-oriented computer systems are now proliferating in the U.S. These systems are often tailored to specific industries or environments and in many cases do not require extensive technical expertise on the part of user personnel.

As the development of high-level and very high-level languages allows many kinds of professional people to "just happen to be experts in the use of computers," will unions that have represented a wide range of white-collar workers for decades suddenly be de facto bargaining agents for an important new sector of the computer community?



The Model-Builder

DATA PAST

Five Years Ago
April 5, 1976

WASHINGTON, D.C. — One supermarket committee did a quick about-face after a study found customers were dissatisfied with supermarkets that replace prices with the Universal Product Code (UPC). The Ad Hoc Committee on the UPC, which sponsored the $75,000 study, recommended that stores using scanners follow the traditional approach to individual item marking.

— — —

MARLBORO, Mass. — Digital Equipment Corp. added another KL10 processor to the Decsystem-1080 and came up with a dual-processor configuration that was the most powerful in its repertoire. With the Galaxy Batch software, included with the Decsystem-1088, the configuration was said to offer users both interactive time-sharing and increased batch capabilities.

Ten Years Ago
April 7, 1971

NEW YORK — A computer service bureau customer won more than $1 million in damages as a result of the bureau's failure to perform its contracted obligations. The winner of the judgment, Law Research Service, Inc. (LRS), said it probably represented the largest amount ever awarded as a result of a company's failure to deliver computer services. Western Union Telegraph Co. sold the computer services to LRS to build a data base of legal decisions.

— — —

PITTSBURGH — AT&T's Picturephone was being used by the Aluminum Co. of America (Alcoa) to display data from a CPU, but Alcoa found the service was an expensive substitute for a CRT terminal. Alcoa was using desktop Picturephone units to access portions of its IBM 360/65 data base.

LETTERS

Keeping Options Open

Computerworld's March 18 special edition on data communications contained a statement that IBM definitely will not get into the PBX business ["Interview With Dixon Doll"]. This statement, attributed to me, is inaccurate.

The quoted "source" for the mistaken reference was a Dec. 21 *New York Times* article and the context was a discussion of what we see as the central processing complex's continuing role in networking and in automated offices of the future. I did not foreclose any potential future opportunities, including PBXs, that may make good business sense to IBM.

Frank T. Cary
Chairman of the Board
IBM
Armonk, N.Y.

Portland's Videotex

The *Extra!* edition [March 18] was simply great, particularly the comprehensive article on videotex by Elizabeth Ferrarini. As a Portland resident, I found it particularly interesting. The Portland Telidon implementation is apparently assured with the city council voting unanimously and the losing cable companies announcing there would be no court fight or referendum.

Portlanders are understandably proud, but videotex standards are important to everyone, both DP professionals and citizens alike, because videotex may be the primary medium for distributing "electronic magazines."

If it is axiomatic in telecommunications that processing is cheaper than bandwidth, then Telidon's PDI structure must be considered the most reasonable approach to high-resolution graphics. While I am keeping an open mind on this lively issue, it seems to me that the "typewriter graphics" and bit mapping techniques of the French and British systems are either too limited or too expensive for "magazines."

Apparently Time/Life feels Telidon is a superior system and recently announced that a full satellite transponder would be dedicated to Telidon "magazines" seven days a week, 24 hours a day, this year.

The debate is, of course, a heated one. I hope broadcasters and the Electronic Industries Association will look toward the future in determining the fate of teletext and its viewdata cousin. Full-power and low-power TV stations can transmit fullchannel, commercial and noncommerical, "magazines" to traditional home receivers or tomorrow's portable flat-screen TVs.

It would be a pity if broadcasters attempt to "kill" this beautiful new medium because of media rivalries and commercial competition.

Sam Churchill
Federation of Local Information Providers
Portland, Ore.

Contract Programmers

Alan Saltman's article "Hiring Contract Programmers" [CW, March 16] contained a mixture of facts and opinions that should have been printed in the editorial section.

Saltman wrote that "free-lancers" promote employee turnover. I would think this would be like tying a rope around your neck on a skydive. Come on, Mr. Saltman, you can surely dream up a better one than this.

It is my opinion that "free-lancers" who are serious about making a living should incorporate to avoid any questionable business practices.

Marvin J. Tenjum
Milwaukee, Wis.

HUMAN CONNECTION/Jack Stone

Users Question Computer Center Support

In line with last week's column on user perceptions and understandings of the computing business, I have prepared several questions that are representative of those I have received lately from new users, along with answers I gave, which readers may find useful.

These answers are necessarily simplistic and, therefore, may not be applicable in particular situations.

Why do we face what seems to be a never-ending stream of system "bugs"?

Few users appreciate that nearly all major computer installations are operating at the "leading edge" of the technology, in that the computer system designers are continually striving to obtain the maximum performance possible from the newest, smallest, lowest cost equipment that can handle the work load.

There's enormous potential payoff with this philosophy, particularly with respect to cost savings during system development and equipment acquisition phases. However, the process of reaching the payoff is not without attendant risks. One of these is the prospect of dealing with new equipment that hasn't had years of customer experience behind it.

Users must learn to appreciate that bugs undoubtedly will occur. But if the bugs aren't evident, the users will find features that don't operate efficiently. And if these features haven't been uncovered, there will surely be one deficiency or another that will frustrate the users, if not dismay them.

Users must further understand that they will be forced to handle "deficiencies" for the life of a system.

Users have one of two clear choices ahead of them in addressing system bugs: 1) drive daggers into their hearts, or 2) stop complaining and find ways to get around the bugs and thereby learn to live with them.

Whose Responsibility?

Why can't we be assigned at least a minimum level of system development responsibilities so that we can generate simple applications ourselves? Our problem is that the computer center is so engrossed in the large systems that our development projects are way down the list of priorities.

This question is just another example of a classic challenge involved with structuring large organizations: headquarters vs. field responsibilities. In the case of information systems development, the issue, simply stated, is this: Should systems development take place in the field where knowledge of the application is available but where resources are limited? Or should systems development take place at headquarters, where a standard system can be developed for all field sites — a very economical approach — but the design may be off the target relative to needs of the field sites?

Ultimate Solution

Perhaps I am merely avoiding a confrontation, but I believe that the ultimate solution to this issue is a combination of the two approaches: large or expensive or complex or standard systems would be developed, distributed and maintained on a centralized basis; and small or low-cost or straightforward systems would be handled by the field sites.

But users greatly underestimate what has to be done in the development effort, even more in the maintenance area.

Specifically, field sites must first demonstrate to their own satisfaction (with the DPers keenly observing from a distance) that they are able:

1) To manage and operate "packaged" systems.

2) To attract the technically trained staff necessary to support system developments or otherwise acquire and operate the computer software appropriate for development, or both.

3) To commit long-term, ongoing resources to maintain locally developed systems.

From everything we hear, there seems to be a continual change — or is it chaos — in the information systems activity. We read about new products and services and personnel turnover and increasing demands for systems. How can we hope to achieve the stability necessary to reap

(Continued on Page 64)

THE TAYLOR REPORT/Alan Taylor

Cobol-81: Search for a 'Solution'

The extent of the Cobol-81 disaster is now becoming clear, and the possible costs to users may be even more than Share estimated two years ago. Conversion cost estimates of more than $500 million for the U.S. government alone and several billions for the country as a whole are now being published.

No one has really disputed these figures, and protesting users like John Brophy of the Travelers Insurance Companies (Travelers estimates its conversion costs at $20 million) are still being met with the stale argument that any opposition to change is shortsightedness or worse.

Few people are lining up the various alternatives and considering which is best. One person who has an alternative is Brophy, the current leader of the fight against blindly accepting the American National Standards Institute's (Ansi) new, proposed, incompatible standard.

Brophy's basic idea reminds me of the technique for choosing Popes — get the players into a room and don't let them come out until they have a result. Actually, he wants to get a group of experts together for between two weeks and two months, give them the problem of the need for upward compatibility and change and let them work on it until something acceptable emerges.

A nice idea. But would it work?

Two Groups Needed

The technique seems to involve two groups of people: a set of experts to make suggestions and a set of users, like Brophy, to evaluate the suggestions and either accept or reject them.

For instance, consider the problem with the ALTER verb. The language experts would note that taking it out of the language would cause a compatibility problem, so it would be a proper item for discussion.

The experts might suggest that compatibility could be maintained and the problems of ALTER faced if all newly written programs barred the use of ALTER, but ALTERs were permitted when patching already-working programs.

(To do this, some compiler expert would need to be able to show how the compiler could discriminate between the old and the new portions of the source code, but I think this could be done.)

This solution would, apparently, be reviewed by the manager group to see if it would give them upward compatibility.

I put the question to Brophy recently, and he objected to it, feeling that sometimes the ALTER is all right. Assuming that this view predominated in the manager group, the experts' suggestion No. 1 would be rejected.

However, Brophy was prepared to give the experts something: diagnostics. "They can harass us with printouts," he said. "Something like: 'ALTER, WHICH HAS BEEN OFFICIALLY DISAPPROVED FOR MODERN COBOL, HAS BEEN USED IN THIS SOURCE CODE.' "

That's a nice idea, but frankly I don't think it will help stop the use of ALTER. And, presumably the experts couldn't really expect such a weak method to work, either. Bang goes the experts' first approach to ALTER.

Second Try

Finding the suggested diagnostic-only method a dead end, the experts might come up with another solution — use of Ansi-74 and Ansi-1981 compilers. Maintenance of ALTER-containing programs might be carried on one compiler, while the addition of modern source programs, without ALTERs, could be handled on another.

Again, I put this possible approach to Brophy, and again he rejected the concept. This time his rejection was based on the grounds that this would involve him in the support of two compilers. (He previously had pointed out that vendor support of the earlier compiler might stop.)

I didn't go any further — and frankly, I don't think the experts would either.

Brophy's suggestion, at least as currently phrased, seems to mean that a different, but just as dictatorial, standard is to be applied, with the managers having the right to ask for all the benefits without having to inconvenience themselves in any way! Under these circumstances, the Brophy idea is no more workable than is the current Ansi method, which allows the developers to impose upon the users practically anything the developers want.

This is not to say that the Brophy idea should be ignored, even though it really is an extreme one. It should be recognized for what it is — the one-sided argument that matches the equally one-sided Ansi argument.

Now is the time for constructive

(Continued on Page 64)

SOCIOLOGY OF COMPUTING/Robert L. Glass

Crossing the Boundary From Individual to Team

The boundary layer between the academic and industrial worlds is subject to turbulence.

Some of the turbulence is well-known — the student moves from learning to earning as the prime motivator, for example. But some of that turbulence is not so well-known.

This is a note about one of those less well-known areas.

In the academic world, the student functions as a competing individual among competing individuals, and group activity is often thought of as cheating. In the industrial world, the employee functions as a team member, and group activity is the primary ways things happen.

In the academic world, the individual is given credit for what he does. In the industrial world, the individual's role often dissolves into anonymity.

In the academic world, building on the work of others is questionable. In the industrial world, building on the work of others is common sense. (The other alternative is called, with considerable disdain, "reinventing the wheel".)

In the academic world, copying is wrong. In the industrial world, cutting and pasting from previous documents to make new ones is expeditious and wise.

The transition from wrong to right comes suddenly. The transition from competition to cooperation is unexpected. The transition from individual importance to individual anonymity may be painful.

Whatever else the transition is, it will be turbulent. Boundary layers are like that!

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- **DP experts in banks whose techniques are doing to paper money what money did to the barter economy.**
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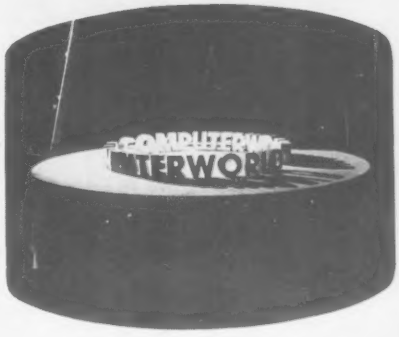

Computerworld for television will also step back a bit to provide some perspective on the continuing rapid technological changes in computers. Where is technology today? Where might it be tomorrow? What significant new products are becoming available? How is the industry changing and what is the impact of that change?

And, we aren't forgetting the lighter side. We'll cover a computerized adult game that helps you improve your sex life. Or the latest in non-sexual computerized entertainment. We have commentary on some of the pitfalls and problems on dealing with computers—both as expert and customer.

There's much more to Computerworld for television, but we can't go into it all. We invite you to find out for yourself. Both experts and interested laymen will enjoy and benefit from this unique new television experience. We're starting with coverage of 13 major tv "ADI'S" (Areas of Dominant Influence), which include about half the computer people in the U.S. Later we will add more markets.

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Washington, DC	WDCA	20	4/11	Saturday	12:00 Mid.
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Dallas/Ft. Worth	KNBN	33	4/7	Tuesday	5:30 PM
Detroit	WXON	20	4/11	Saturday	10:00 AM
Minneapolis/St. Paul	KMSP	9	4/11	Saturday	TBA**
Houston	KHTV	39	4/6	Monday	12:00 Mid.
St. Louis	KDNL	30	4/12	Sunday	5:30 PM
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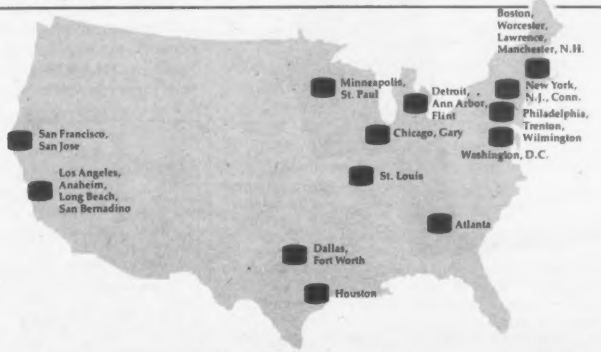

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READER COMMENTARY/Paul A. Callender Jr.

'Reference' Manuals Can Make Life Difficult

One of the most severe problems in DP-related documentation today is the predominance of the "reference" manual. The average reference manual is seemingly logical in format and yet usually difficult to use.

It assumes that the reader is generally familiar with the subject, when the opposite is usually true. It is not function-oriented.

The other extreme is the "training" manual. It is function-oriented, full of examples and difficult to read quickly. Details are hard to assimilate.

There is an alternative document that combines the best of both extremes. It is function-oriented, logical, starts from an overview and allows the reader to go down to the level he requires. It is easy to learn from and can be used as a reference document. This type of document is just as easy to prepare as the "reference" manual, but is a lot more useful.

Another concept in documentation pertains to the level of information the document supplies. Technical descriptions tend to give the reader too much or too little information. "Too much" means that every time there is a minor change in the system, the documentation must be updated. "Too little" means that the user does not have enough information and must waste time getting it.

An "intermediate" level of documentation is needed, one in which minor changes need only be noted in such places as the comments in the listing. Only major changes to the system need affect the documentation.

Finally, documentation must be written in clear, concise and simple English. Short sentences help. The document must talk *to* the reader, not *down* to the reader.

Technical terms should be used as little as possible in the management and user documents and never used unless previously defined.

Callender is with Information Specialists, Inc. in Sparta, N.J.

Will 'Solution' Work?

(Continued from Page 61)

and creative thinking on all sides, aimed at the development of principles regarding compatibility and standards and a mechanism for putting them into force. There is plenty of technical room here for real, 1980s creativity.

All the current Cobol thinking is still being done in the framework of vendor-controlled operating systems, batch compilations and hardware-dependent language compilers that can be called Cobol simply because they can handle a minimum amount of Cobol source. These concepts are fast becoming technically and economically obsolete, and it is time for Ansi, users and developers alike to face up to this. Major changes to Cobol thinking will probably be needed to provide a proper balance, but the alternatives are even more undesirable.

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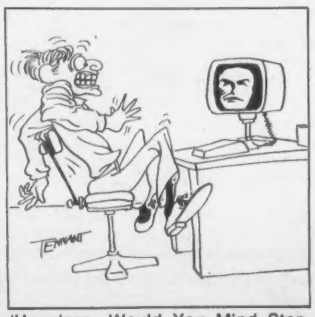
Users Question Systems Support

(Continued from Page 61)

the full investment in our computer operations?

Almost every computer center director has stability as a major goal. But for many centers, there are external pressures that buffet the best-laid plans. They include: shortages of skilled systems personnel, changing markets, development of advanced technologies, industrial competition, plus — and this is not intended in the way of an excuse — short-term revisions by top executives of master plans for information systems.

Under such conditions, it's tough for these directors to get their management act together. But I'll say this for them: As a group, they're among the finest managers in the country.



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LETTERS

Title Didn't Match

"Focus on Data Terminal Equipment" [*CW Extra!*, March 18] was a well-written and very informative article dealing with present-day computer terminals. But, there was a problem with this report: the title and the article *did not* match.

Data terminal equipment, by definition, not only includes computer terminals, but also encompasses modems, printers, teletypes, multiplexers, concentrators and other hardware devices. The definition of "terminal" in "data terminal equipment" is not limited to the computer terminal with a keyboard and screen, but rather, and in a more general sense, refers to the equipment at the end of a network node (hence terminal).

I think it is very important in a relatively new and emerging field such as telecommunications that readers not misinterpret the use of its terminology.

John Dempsey
San Luis Obispo, Calif.

Absurd Drivel

The March 9 editorial "Jump on This Bandwagon" was the most absurd piece of drivel I have ever seen printed in a trade publication. The proposed I/O interface standard is being brought to us by the same wonderful group that brought us Cobol, only to tell us 20 years later that without Ada, our products didn't meet Department of Defense requirements. Who are you trying to kid, anyway?

Speaking of Cobol, on the facing page of the same issue, Alan Taylor decried the antics of Codasyl, which seems to have nothing better to do than make changes for changes' sake. Tell me, do we get another I/O interface standard when IBM develops a newer, cheaper, faster, more reliable interface, or when some Uncle Sam programmer decides he doesn't like this one anymore? Surely you don't mean that the government has made a lasting and final decision!

Bureaucrats should stay the hell out of the computer industry before it ends up in the same mess as the auto industry. *Computerworld* does the people who keep it in business a disservice by asking for government interference with their business.

The editorial's allusion to free enterprise at work is comical. Do you really mean that free enterprise is only logical and practical because of the size of IBM's user base? My God, Tom Watson has saved the world from total collapse. Actually, to mention free enterprise and government standards (i.e., regulation, i.e., strangulation) in the same article is asinine. There is no logical relationship.

If CW really believes government control of business is to be supported by anyone outside of government, perhaps we can suggest that the government regulate the advertising rates of computer trade publications.

Barry Gilmore
Mission Viejo, Calif.

DBMS vs. DMS

"When Is a DBMS Not a DBMS?" [CW, March 16] would mislead readers. Datapro Research Corp. was quoted as defining a DMS (data management system) as one designed to process a single application — as opposed to a DBMS (data base management system), which is generalized toward multiple applications.

A DMS is in fact a generalized system. An "accounting package," for example, is a single application system and definitely not a DMS.

The differences between DBMS, DMS, "file processor" and "retrieval system" have become increasingly obscure as features have overlapped and systems have expanded.

More important for user organizations are specification of functions required and evaluation of software available against requirements.

As a note of warning, the "21 DBMS offerings" in the tables necessarily represent an arbitrary selection from among the many systems marketed.

Further, the degrees to which each of the 21 possesses the listed features vary considerably.

Carl Cagan
Carlsbad, Calif.

At Waterloo, Intel's FAST-3805 won.

The FAST-3805 saves the University of Waterloo thousands of dollars each month while it increases both user and system productivity. Waterloo's Associate Director-Systems, Romney White, explains how . . .

"Compared to any other DASD, the FAST-3805 in Native Mode* is the fastest thing going. It has a large enough capacity to satisfy the biggest users around, and it's a cost-effective solution. In other words, the FAST-3805 is really an ideal paging device.

"The FAST-3805 reduces paging overhead and increases paging capacity. It's an economical solution for extending current CPU resources."

Increases productivity

"We discovered that our 4341 by itself supported only 25 active users. With the FAST-3805 we were able to double the number of active users at less than half the cost of a new processor. And those users got more consistent and faster response times.

"We found the FAST-3805 eliminated page wait and the page wait that masquerades as I/O wait, as well as reduced device, controller and channel contention. The result was more users who are more satisfied."

Fast paging saves dollars

"On our 3031 we had a page wait of about three percent with two 2305s. However, when we switched to a FAST-3805—which brought in pages about two and a half times faster than the 2305s—the page wait went to zero. In our situation, switching to the FAST-3805 saved us a couple of thousand dollars a month in system and people time. But a user who has a 3033 with a 15 percent page wait could save $15,000 to $20,000 a month.

"Not only did the FAST-3805 take the place of two 2305s and a 2835 controller at Waterloo, but it helped us avoid the purchase of another 2305/2835 system. With the FAST-3805's increased capacity, we were able to stay within our budget . . . and still meet the increased needs of our users.

"Because we wanted to get the most out of our current system, we saw the FAST-3805 as a good investment. We looked at the available paging devices and determined that the FAST-3805, because of its micro-coding, offered the most flexibility.

"The installation was a breeze. Service has been good—and the unit is essentially self-diagnosing. The FAST-3805 is much more reliable than our previous disks.

"In summary, Waterloo got more capacity, better performance and better reliability for less money with Intel's FAST-3805 semiconductor disk."

If you are interested in learning how the FAST-3805 can unleash your system resources and increase your personnel and system productivity, contact Intel's Marketing Information Office at 512/258-5171. Or clip and mail the coupon below.

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*Native Mode and 2305-emulation are two personalities of the FAST-3805 currently available.

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READER COMMENTARY/Greg Young

Acronym Attack

The Committee to Reduce the Use of Acronyms (Crua) announced today the formation of the Acronym Reduction Program (ARP). The ARP will be implemented by release of two types of information.

First is the monthly Acronym Newsletter (Cruan, or AN for short). The AN will contain Notifications of Discontinued Acronyms (NDA) and Notifications of New Acronyms (NNA). In addition to the DNAs and NNAs, the AN will list Acronyms Under Investigation for Discontinuation (AUI_D) and Acronyms Under Investigation for Implementation (AUI_I). It is the hope of Crua that the number of NDAs and AUI_Ds will exceed those for NAAs and AUI_Is.

The second vehicle for ARP will be the Technical Bulletin (TB). TBs may be issued as needed, and — at this writing — are foreseen as an aid to Acronym Conflict Resolution (ACR). ACR is required when identical acronyms are developed for different phrases.

Crua hopes that the implementation of ARP, as reflected by the AN and TBs, will alert the public to the Growing Danger of Acronym Proliferation (GDAP).

Young is with Safeway Stores in Oakland, Calif.

LETTERS

Basic Misinformation

I read with concern "A Survey of Distributed Network Architectures" by Gerald L. Power [*CW Extra!*, March 18].

The preface to that article stated that the information would provide the reader with "an overall broad-based viewpoint" that he could use "to begin a comparison [of presented network architectures] or to aid in the development process of a computer network." The preface also added the disclaimer that the information presented was "severely limited" because of varying amounts of available printed material. For the reader to use the information in the manner suggested above, however, he must be assured that, though perhaps limited, the information was at least accurate.

The discussion of "DNA (NCR)" points out some of the article's fundamental misinformation on the current status of industry network architectures.

First, for the past 18 months, NCR's network architecture has not been Distributed Network Architecture (DNA). In late 1979, the corporation adopted CNA (Communications Network Architecture) as its corporatewide communications architecture. Therefore, any discussion of DNA as NCR's network architecture was totally inaccurate.

Furthermore, the adoption of CNA did not represent, as the article stated, an alteration in the DNA philosophy which is "now more generally referred to as the Communications Network Architecture (CNA)." That statement implied that CNA evolved from the former architecture, an implication that is inaccurate and represents a fundamental misunderstanding of CNA — its history and basic philosophy.

CNA did not evolve from DNA. After several years of development, it was first introduced in October 1977 by then-independent Comten. Two years later, it was adopted as NCR's corporatewide communications architecture.

As a data communications philosophy, CNA does more than allow NCR "to place its terminal networks transparently within a complete SNA [Systems Network Architecture] network," as the article stated. A CNA network also provides connectability to the various common carriers, an easy interconnection of NCR products and a high degree of connectability to IBM-compatible pre-SNA and SNA products.

In addition, CNA permits the use of the facilities of the common carriers such as AT&T, GTE Telenet and Tymnet in the U.S. and those provided by the Postal Telegraph and Telephone (PTT) administrations in the international marketplace. In short, a CNA network is not vendor-unique; instead, it offers the user cost-effective choices among implementations, products and services.

If readers need further clarification on this matter, I would encourage them to contact me in St. Paul. I would also refer them to Joseph St. Amand's recent article, "Shopping for SNA Outside IBM" (*Data Communications*, January 1981).

Ronald M. Groenke
Vice President
Systems Development
NCR Comten, Inc.
St. Paul, Minn.

Details on Series/1

I would like to clarify a few misleading statements in "For Some GSD Systems, There's No Comparison" [CW, March 9]. I have extensive experience with the Series/1 and with the IBM Control Program Support (CPS) Virtual Cobol. The article stated that the Series/1 has "three CPUs, and each one takes a different operating system." CPS Virtual Co-

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The article also implied that CPS is used only for "communications processing in distributed networks." CPS has many additional uses, including commercial stand-alone and distributed systems, data entry systems and data base inquiry systems. We are currently using CPS Virtual Cobol for our program development and we are the support group for customers running business applications and data management functions with CPS Virtual Cobol.

The article stated that The Yankee Group says " . . . a migration out of the Series/1 family would require extensive changes in code and files . . ." CPS Virtual Cobol is Ansi 1974 level Cobol and can be easily migrated from the Series/1 to a larger system that supports Ansi 1974 Cobol. The user would *not* "virtually have to revamp his mode of operation" as The Yankee Group indicated. In addition, our users have enjoyed great success in converting existing Cobol programs to CPS Virtual Cobol.

Additional details on the CPS Virtual Cobol and the IBM Series/1 are available from Advanced Software Products, Inc. or IBM.

Katherine Higgins
Vice-President
Advanced Software Products, Inc.
Delray Beach, Fla.

Cutting CRT Noise

Regarding Stuart Dole's letter questioning the whistling sound he hears from CRT terminals [CW, March 9], the sound usually is caused by the flyback transformer in the high-voltage power supply. A standard television set in the U.S. is designed for a 525-line picture updated at 30 frames per second. Thus the flyback transformer is operating at a frequency of 15,750 Hz. The transformer core and/or windings may be vibrating at this rate, causing the sound Dole hears.

Sponge cushions and wax coatings reduce the noise level in more recent transformer designs. Adding an insulating blanket of fiberglass to the inside of the CRT terminal housing (if this can be done without interfering with ventiliation of the electronics) may be helpful in attenuating this sound. If inspection of the flyback transformer shows that elements (core and windings) are loose in the mounting bracket, then replacement of the transformer may be the best bet.

It may be possible to pack fiberglass insulation around the transformer itself (these are sometimes mounted inside solid metal enclosures).

Caution should be exercised when working near the high-voltage section of a CRT terminal or television set, since capacitors there may hold a charge in excess of 15,000 V even after the set has been turned off. A knowledgeable technician will ground these capacitors first, to discharge them, before working with a flyback transformer in a circuit that has been operating.

George F. McClure
Winter Park, Fla.

Wrong Manager

The person credited as the manager of our Wards Credit Card Security Service ["Credit Card Listing Services: Are They Secure?" CW, Feb. 23] is a customer service manager and had been on the job only a few weeks.

The general manager of the service is Elizabeth Warden, who is a spokesperson for both the operations side of the department and marketing.

The second paragraph mentioned that "security is tight, so tight that no one seems willing to talk about it." We believe that a supervisor should be hesitant about divulging information that she shouldn't have been asked to comment on in the first place.

Wards Credit Security Service has several hundred thousand members, members who have been very supportive of what we offer.

I believe *Computerworld* should consider another story on Wards Credit Card Security Service to emphasize its good points and to give some recognition to its general manager.

Gary Klasen
Public Relations Manager
Wards Credit Card Security Service
Evanston, Ill.

LETTERS

Hard-Coded Limits

My opinion that systems' designs reflect the egocentricities of the designer is beginning to surface. I am referring to the recent scam at Wells Fargo [CW, March 9].

Some designs seem to inherit some of the human limitations. Knowing the dollar limit at which flags and whistles are activated may boost somebody's ego, but it really is not necessary that anyone, not even the designer, know this limit. Warnings of this type should establish a daily low limit at random to provide unpredictable coverage and diminish any risk within a wider range.

I realize that a system design flaw of this type is more complex than my above assumption, but the fact that a static, probably hard-coded, limit exists seems an unnecessary oversight.

C.E. Meeks
Alameda, Calif.

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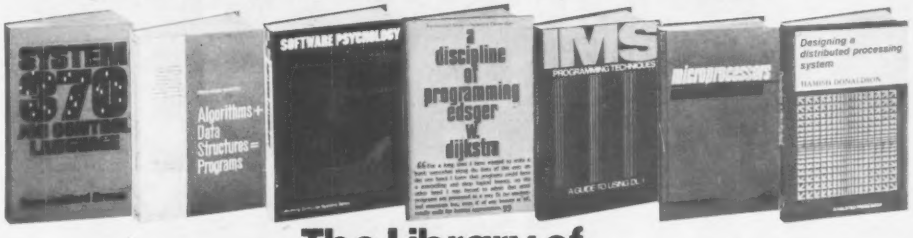

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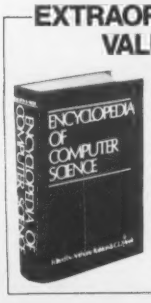

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LETTERS

Trouble Ahead?

I would like to take exception to the implication that "[staff turnover] is nothing but a figment of the industry's fevered imagination" ["Staff Turnover No Problem, Surveyed Managers Report," CW, Feb. 23].

In my opinion, that "bugaboo" has existed since at least the third-generation explosion in the early 1960s and it continues today. I suggest that the survey results reflected only the past 15 or so months since interest rates (specifically 14% to 16% mortgages) have made it less economically feasible to pick up and move.

Good qualified personnel have always been hard to find or train, and those available are being spread even thinner as the demand increases with the explosion of computer installations. Any manager believing the article is in for trouble as either a reduction in mortgage rates or salaries that lag behind inflation will soon return us to our accustomed environment — turnover. The two occurring at the same time may well spell disaster for some installations.

P.M. Wilson
Simpsonville, S.C.

Need for 'Head Hunters'

When reading the interesting article "Staff Turnover No Problem" I was literally knocked off my chair when I read the part about managers and their obvious dislike for recruiters or "head hunters." Well, I'm one of those dreaded animals, and frankly I'm proud of it. The main reason is that I feel I represent myself and my company in the most professional way possible.

Granted, there are a few firms that will do anything to get a name, but bad apples come with the cream of the crop. As recruiters, we are mere extensions of personnel and management departments. It's humorous to see that those managers that can't stand us are the same individuals that hire our candidates and then pay our fees.

Why would you think this to be? Because the people we locate are the DP professionals that have established themselves as competent to handle anything that may arise. Hopefully, they will need very little, if any, training. This type of individual is not the type of individual that can be reached through normal advertisement procedures. Hence, the need for "head hunters."

Regarding the statement that recruiters fabricate a desire for a job change, one must remember two things. One, if a better position does not in fact exist, an employee will not make a job change. Second, it is not the recruiter that hires an individual, that makes an offer, or that accepts an offer. Let's place a little blame on those managers that make that offer and that ex-employee that accepted it.

If companies were more respectful of their DP professionals' needs, there would be less turnover because of an increase in employee loyalty.

Geoffrey C. Roberts
Southfield, Mich.

More on Operations

How about a few more articles concerning the operations area of data processing, which in the past couple of years has come into its own as a definite career path within itself?

Computerworld is still the best specialized publication on DP to be found, but it needs to remember that DP is made up of several groups of people with highly technical skills. In addition to programmers, managers and system analysts, there is another group of specialists — operations personnel — from control analysts to data entry, to off-line equipment operators, to computer operators.

All of these positions have become vital parts of the whole DP installation and should be recognized as such.

Larry Wickman
Waco, Texas

On Shugart Drives

My attention has been drawn to "A Floppy Primer — Part I" [CW, Jan. 12] by Robert Steinberg. Steinberg stated that the "target figure" for single track wear is two million revolutions. Shugart Associates, the world's largest manufacturer of floppy disk drives, requires that media qualified for use with our products be able to withstand at least 3.5 million revolutions on a single track without significant signal degradation.

While the Ansi specification X3B8/80-23 states, "The minimum number of wear revolutions shall be negotiated between the concerned parties," the major media suppliers have formulated their products to conform with the Shugart requirements. Therefore, the user of a Shugart drive with appropriate media should expect a minimum life of 3.5 million revolutions on a single track.

Donald B. Lowe Jr.
Advanced Products Manager
Shugart Associates
Sunnyvale, Calif.

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With Processor, Data Dictionary

Infodata Updates 'Inquire,' 'IQ/ NET'

FALLS CHURCH, Va. — A generalized Full Screen Maintenance Processor and Data Dictionary has been added to Infodata Systems, Inc.'s Inquire and IQ/NET data base management systems (DBMS).

For the end user, the new capability means faster and easier data entry and updating using the IBM 3270 series of full-screen terminals, the vendor said. Menu screens lead the user from single or multiple key record selection through viewing and updating.

Update values are automatically checked against lists of acceptable values, ranges or encode/decode tables controlled by the Dictionary, as well as standard numeric and other checks. Invalid data is flagged using the color or dual-intensity features of the 3270.

Definition of screen formats (called panels) is done on-line with free-form commands. The user essentially draws a picture on the screen of what the terminal operator should see. Panels are immediately executable, facilitating application prototyping and production, the vendor said.

Maintained as an on-line data base, the Dictionary is updated through full-screen prompts and commands. It drives data base creation and creates control blocks for host programs, reducing programmer coding time, according to Infodata.

The vendor said the Dictionary will assist overall data base design by enabling planning of data base and data element definitions, eliminating duplication and inconsistency and providing for documentation of the design process.

Predefined report macros provide basic dictionary reports for data base administrators, applications analysts and users. Since the Dictionary is on-line, the Inquire and IQ/NET nonprocedural user language can be used for ad hoc reporting needs.

The Generalized Full Screen Maintenance Processor and Data Dictionary is available to users of IBM 370/30 series or 4300 series computers under MVS, VM or VS/1, with TSO, CMS or CICS.

In the Inquire environment, the one-time license fee will be $27,000 to $35,000, depending on existing configurations. Under IQ/NET, the license fee is $14,000 to $19,000.

Introductory discounts are available to current Inquire or IQ/NET users, Infodata said from 5205 Leesburg Pike, Falls Church, Va. 22041.

Intel System 2000/80 Release Includes Interface to Plex

AUSTIN, Texas — Intel Corp. here introduced Release 2.80 of its System 2000/80 data base management system (DBMS).

Designed for the Network Operating System (NOS) and NOS batch entry (B/E) from Control Data Corp., the release includes several new item types of storing data, extended search capabilities, enhanced string and function usage and security capabilities and an interface to Intel's Programming Language Extension (Plex).

Single- and double-precision floating-point items and the ability to build arrays of different item types are of primary emphasis for Release 2.80, Intel said. The binary type is also available with this release.

The WHERE clause featured in System 2000/80's self-contained facility and Plex has also been extended to include the following capabilities:

- Data bases may be searched for nonkey items.
- Item-to-item comparisons are possible during the search process.
- Substrings or characters within the values of a specified character of text item may be searched for in the data base.

The process for enforcing data base security has also been simplified and made more efficient by eliminating the need for users to maintain many similar data bases solely for security reasons. Release 2.80 enables the master password holder to restrict the access of a second password holder to specific data entries.

The Plex interface is available for use with Cobol and Fortran and provides DBMS search and manipulation capabilities to the application developer.

Available immediately, a typical release 2.80 CDC configuration, including the basic data dictionary, queue access, Plex, data base manager, report writer and Quest query language, costs approximately $120,000. Intel Systems Group is at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Firm Providing Continued Support For System/3 Sites

MARINA DEL REY, Calif. — Ferguson Tool Co. here is continuing its efforts to "keep [IBM] System/3 sites in business" with its release of the Version 17 operating system.

The independent software house took over operating system support for the System/3 models 8 and 10 user base after IBM dropped it last Oct. 10. Models 12 and 15 of the series were not affected by that announcement.

Version 17 is an upgrade to the IBM operating software, according to Richard L. Hecht, vice-president at Ferguson. It incorporates and replaces the independent vendor's Elimn8/Rejvn8 program to speed

(Continued on Page 74)

Report Generator Fits System/34

E. WILLISTON, N.Y. — A report generator for the IBM System/34 designed for use by nonprogrammers has been announced by PS Systems.

The two-part EZ-List consists of a documentation aid enabling the most frequently used files to be documented in one terminal session and a report aid that prompts the user in English and requires only "yes" and "no" answers to produce or modify reports, the vendor said.

EZ-List is priced at $750 and is available from PS Systems, 27 Atlanta Ave., E. Williston, N.Y. 11596.

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- MSM can be installed in **10 MINUTES** — NO IPL is required.
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GCD Global Console Director

The Global Console Director is an extremely flexible tool. It allows (selected message streams from different systems to be logically "blended" to create a **unified system image** to whatever degree desired). In a slightly different vein, GCD allows **any** console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex!

GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems. In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

GCD can improve overall throughput by simplifying operations. By allowing several physical consoles to be logically merged, excess devices can be eliminated for immediate savings, or deployed elsewhere to strategic advantage.

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HP Improves MPE IV '50%' at No Extra Cost

CUPERTINO, Calif. — Up to 50% better performance at no extra cost is being claimed by Hewlett-Packard Co. for its MPE IV version of the HP Multiprogramming Executive operating system for users of HP 3000 business computer systems.

Enhancements for more throughput and better response times on HP 3000 computers include improvements to the operating system's memory and file-system management, as well as to dispatcher-scheduler, spooler and input/output operations.

An interprocess communications facility has been added, which is said to make it easier for users to share information in multiple-process applications and across data communications lines.

Memory Manager

The memory manager in MPE IV can handle larger memory sizes (up to 4M bytes on the series 44) than MPE III, the vendor said. The memory manager also handles memory requests in parallel and uses more efficient memory management algorithms than MPE III, according to HP.

With MPE IV, virtual memory can be spread across multiple system domain disk, thereby enabling more and larger applications to run simultaneously on any HP 3000.

This can allow users to reduce I/O contention on the system domain disk and improve system I/O performance, the vendor said. Internal file system management has been enhanced to make internal control block handling more efficient, according to HP.

The dispatcher-scheduler areas of MPE reportedly give users more control over system work load. Access to disks is queued, depending on the priority of the requesting process, to ensure that higher priority processes will receive better access to disk and memory resources.

TUNE Added

A TUNE command is provided in MPE IV to give users control over their system work load.

Users can filter out long transactions, such as those in a batch-processing environment, to improve the performance of on-line processing during periods of heavy interactive activity.

MPE IV is software-compatible with HP 3000 computers, series II, III, 30, 33 and 44.

It is available at no additional charge for customers who order new HP 3000 systems or who have HP 3000 series II, III, 30, 33 and 44 computers under HP support contracts.

Schedules for field installation of MPE IV on series II, III, 30, 33 and 44 are determined by local HP sales and service offices, with installations expected to begin in April.

The vendor is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Firm Backs System/3s

(Continued from Page 73)

up system performance between 30% and 50% depending on the disk drive being used, Hecht claimed.

IBM never provided any real upgrading for the models 8 and 10, he maintained, because it sold the operating system together with the hardware.

The Ferguson product offers two-partition support (TPS) that allows two programs to run simultaneously on the same processor, he explained. And, unlike IBM's dual processing feature, TPS does not require any special hardware, he noted.

When coupled with TPS, Version 17 permits print spooling and on-line file inquiry without interrupting the normal job stream, he continued.

Additional Features

Additional product features include conditional operation control language (OCL) processing and the ability to save object sort code in a system library — a capability that wasn't offered in Version 16 of the software, Hecht said.

Speculating that Ferguson may be the only independent system software house serving the System/3 models 8 and 10 market, Hecht stated that by "keeping System/3 sites in business" the firm is discouraging a switch to IBM's System/34, particularly by those users who bought systems rather than leasing them.

The large estimated number of user sites that fit this description — about 8,000 — make this type of market specialization feasible, he said.

Available immediately, the monthly fee for Version 17 is $47.50 for both rental and support.

Additional information is available from Ferguson through P.O. Box 9964, Marina Del Rey, Calif. 90291.

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H200, H2000 Users Offered Aids for 4300 Conversion

BUFFALO, N.Y. — Software conversion tools to assist Honeywell, Inc. H200 and H2000 series users converting to IBM's 4300 series are available from Dataware, Inc. here.

The aids address Cobol to Cobol (CTC); Easycoder and Easytran to Cobol; and Filconvt, a vendor spokesman said.

The major component is the CTC package, which addresses H200 and H2000 series code (Mod 1, Mod 4 and OS/2000) code and generates either IBM DOS or OS Cobol.

Being table-driven, the package can be enhanced for virtual sequential access method (Vsam) files or tailored for in-house customizing under a separate fixed-fee agreement, the vendor claimed.

The standard CTC package, running under DOS or OS environments, leases for $4,800 per year.

Second Component

The second component converts Honeywell assembly language to IBM DOS or OS Cobol. The translator accepts Easycoder Mod 1 (C and D), Easytran Mod 1 (C and D), OS/2000 Easycoder and Mod 4 Easycoder source as input.

The user reportedly has the option of defining the type of assembly language and the type of Cobol to be generated through the use of parameters on an input control card. The conversion system uses a simulation technique to scan and interpret logic sets in the Easycoder or Easytran program.

It examines the entire source program before generating the outputted Cobol source, allowing for a higher percentage of conversion, the vendor said.

The system equipped with a macro preprocessor can handle in-house user macros unique to every operation, Dataware said. The convertor also can bypass sections of source input code.

Cobol Module

The translator produces a Cobol source module along with a conversion worksheet which aligns the original source code with the generated Cobol.

Original data and procedural names, along with comments, are carried forward into the new Cobol program, Dataware explained.

This package is available for customer use at an annual license rate of $18,300, which includes on-site installation and training.

The last component, Filconvt, assists the user in converting data files from the Honeywell BCD to Ebcdic for processing in the new IBM environment. This will be useful, Dataware said, during data preparation and testing phases of a conversion.

The package is available for customer use at an annual license rate of $600.

Dataware is located at 2565 Elmwood Ave., Buffalo, N.Y. 14217.

Basic Program Aids System/34 Conversion

SAN DIEGO — Jedark Corp., a turnkey systems supplier, has developed a Basic Conversion program that converts IBM 5110 and 5120 Basic Source Statements to System/34-compatible Basic.

The program currently being used to convert custom 5110 and 5120 accounting applications for the System/34 can also serve as a tutorial for any organization seeking to acquire expertise in System/34 Basic, Jedark claimed.

The program costs $1,500 for a single user license and can be purchased directly from Jedark Corp., Suite C, 4040 Sorrento Valley Blvd., San Diego, Calif. 92121.

'Relate/3000' Updated

MOUNTAIN VIEW, Calif. — Release 4.0 of its relational data base management system, Relate/3000, is now available from Computer Resources, Inc. (CRI.)

Its new features include advanced security provisions to allow or prevent access at the file, field, record and function levels. There is a views, or networking, capability that permits the user to treat several files (or any parts of several files) as if they were combined into a single file for reporting purposes.

Also included is the capability for the command language inherent within Relate/3000 to access data stored in Hewlett-Packard Co.'s Image data bases as well as HP's Key Sequential Access Method (Ksam) and Multiprogramming Executive (MPE) operating system files.

Release 4.0 of Relate/3000 includes full command-level interface for application programs to allow user programs to communicate with the data base through the command language as if the program were a terminal.

It also provides multiple user access to the data base, a CRI spokesman said.

Relate/3000 runs on the HP 3000 series of computers and is available from CRI for $10,925.

The vendor is located at 2570 El Camino Real, Mountain View, Calif. 94040.

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If your company's information needs are changing fast, the last thing you want is a DBMS that puts severe handicaps on the productivity and flexibility of your people.

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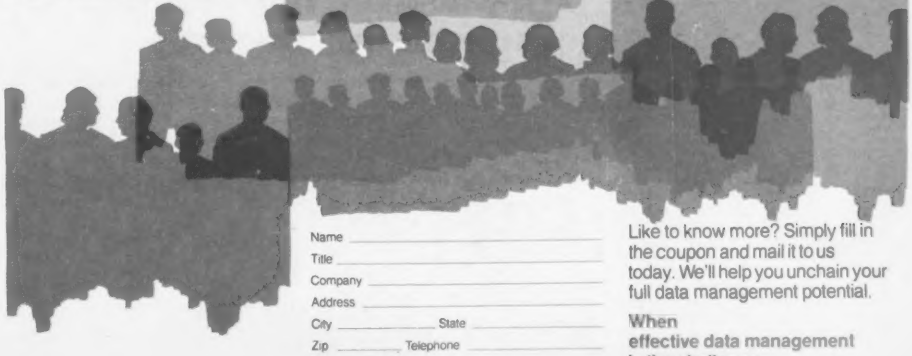
A lot of software companies like to claim they have the answer to DBMS cost effectiveness, programmer productivity, and throughput efficiency. Only ADABAS provides the architecture to support claims like these 100%!



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All of which means the 750 can handle just about anything you can throw at it, including huge computational analyses, big data processing tasks for business, and complex data communications applications.

As you can see, the 750 has a lot in

common with much more expensive mainframes. But perhaps what's equally important are the differences. For example, the 750 is interactive–a highly desirable feature on a computer with this kind of mainframe power.

Also, the same 750 that runs your business programs can simultaneously crunch some very big numbers. And since it's likely that distributed processing will be part of your plans, the 750 is supported by an exceptionally wide range of networking software, including our own PRIMENET,™ which allows local and remote communications, and supports the X.25 international packet switching protocol.

The 750 can stand on its own as a powerful and versatile computer. But it's just one of the fully compatible Prime 50 Series computers–including the 250, 550, 650, and 750–that share the same operating system, the same file system, and the same communications products. So even if you start with a smaller Prime computer, you can upgrade all the way to a 750 without program recompilation or software modification. Which means your considerable investment will be protected.

In fact, when you consider all it can do, a Prime 750 could easily be the best investment you'll ever make.

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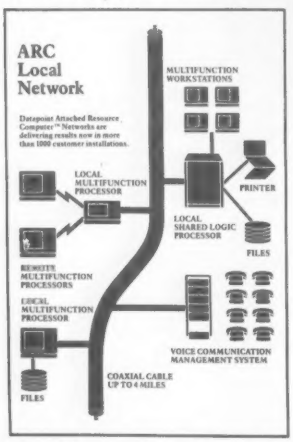
Datapoint introduced local networking over three years ago. Now more business is processed on ARC™ coaxial networks than all other cable systems combined.



ARC networks enable workstations, processors, printers, and files to be linked together so that all resources are available to all users. Shared access brings significant economies while uniting all members of an organization with a high-speed artery for information exchange.

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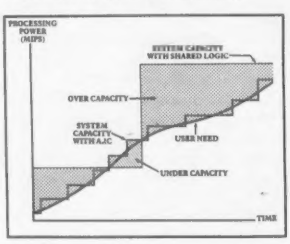
Vic Poor is Executive Vice President of Research and Development at Datapoint. He pioneered dispersed data processing, designed the first computer-on-a-chip, and developed ARC™ —the most widely used coaxial network for linking business machines.

With ARC you add processing power, workstations, storage, and peripherals as your needs require *without constant reprogramming.* And no matter how large the system grows, you'll still get responsive performance at each workstation.



With conventional computers you can only add processing power in large, expensive steps. With ARC, you can add power in small increments, closely matching capacity to user needs.

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DATAPOINT

Tape Manager Fits Sites Using DOS/VSE, DOS/VS

SAN MATEO, Calif. — An automated tape management and control system for installations using IBM's DOS/VSE, DOS/VS and DOS operating systems has been announced by SDI here.

Called Super-Epat, the system is an optional feature of SDI resident productivity module (RPM), a software interface shared by all of the company's products. Super-Epat combines the features available in SDI's Epat system with the features of the RPM, including fixed-block architecture (FBA) support.

Super-Epat reportedly provides improved throughput by eliminating the use of the logical transient area (LTA) during tape open processing. Since there is no need to rename IBM-supplied phases, potential conflicts and problems with software from other vendors are avoided when software maintenance is required, the vendor said.

Security over tape data sets is said to be improved since Super-Epat is permanently resident in memory and is therefore able to prevent circumvention of the system's safeguards.

U.S. pricing starts at $335/mo and varies based upon the configuration. Current users of RPM can add Super-Epat for $215/mo. Super-Epat is available immediately from the vendor at 1700 S. El Camino Real, San Mateo, Calif. 94402.

SDA Updates TP Monitor With Link to DOS/VSE

NEW YORK — SDA's Minicomm teleprocessing (TP) monitor now has an on-line screen creation utility, an interface to IBM's DOS/VSE supervisor and on-line data entry features.

Minicomm is a data communications monitor, which runs on IBM 360, 370 and 4300 under DOS, DOS/VS and DOS/VS and supports IBM 2260- and 3270-type terminals.

New features include improved recovery logic, broader debugging capabilities, more output information and simplified input format.

SDA also has upgraded its Minicomm CRT terminal simulator, which allows an installation to write and test on-line programs without using terminals. The device gives more information in the output listing and simplifies the input format.

In conjunction with the Minicomm enhancements, SDA has prepared two manuals. "Minicomm Concepts and Facilities" defines all the features of the system. "Minicomm On-Line Screen Loader" defines the use and installation of the screen creation capability.

Current users of SDA's Minicomm Teleprocessing Monitor who are under the maintenance agreement automatically will receive the enhancements. New users can obtain the Minicomm TP monitor, including the new features, for $22,000, SDA said from 475 Park Ave. S., 26th Floor, New York, N.Y. 10016.

Software Ties Series/1 Mini With Vtam Host

DELRAY BEACH, Fla. — Software that allows communication between an application program running on a minicomputer and a remote mainframe, without a dedicated connection, is available from Advanced Software Products, Inc.

The Friendly Front End (FFE) package calls for the program to be operating under IBM Series/1 CPS Virtual Cobol. Once contact is established between Series/1 and the Vtam host, the Series/1 appears as a 3274 control unit, and accessibility may be swapped among various application programs running on the Series/1, on a contention basis, according to the developer.

The communication protocol is bisynchronous, with SDLC support under development. Prerequisite to 3270 pass-through is IBM's Intelligent Terminal System. Operation also requires the basic CPS Virtual Cobol Supervisor and Realtime Monitor and for development systems, the CPS Virtual Cobol Compiler. FFE carries a one-time charge of $300 per CPU from the firm at 100 E. Linton Blvd., Delray Beach, Fla. 33444.

Courses Assist Users Of CICS/VS, IMS/VS

VERNON, Conn. — A series of courses directed to users of both CICS/VS and IMS/VS has been scheduled for Houston and Washington, D.C. by Data Base Management, Inc. (DBMI).

The courses include "DL/1 Application Programming," "IMS/VS Data Communications Programming," "IMS/VS Message Format Services," "IMS/VS Dump Reading," "IMS/VS Application Development Facility," "IMS/VS Batch Terminal Simulator," "CICS/VS Command Level Programming" and "IMS/VS Data Base Design." The courses begin in April and run through June, vary in length from one to five days and range in price from $175 to $700.

More information is available from DBMI at 281 Hartford Tnpk., Vernon, Conn. 06066.

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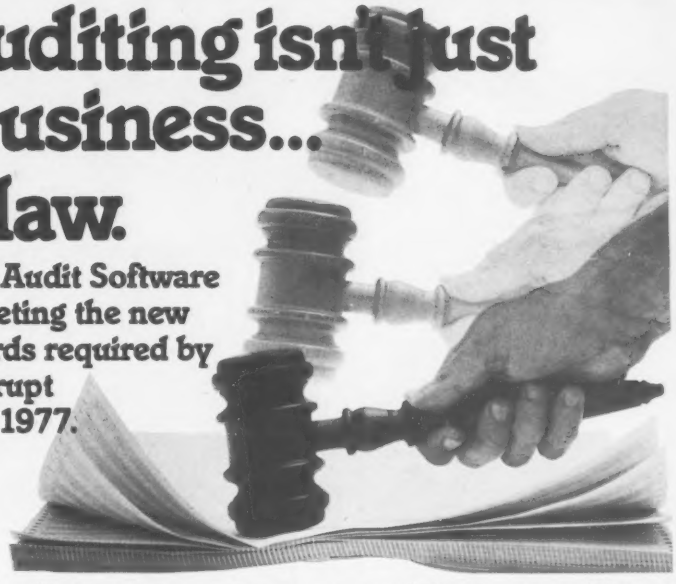

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21	Fresno, CA	12	Winnipeg, MAN	2	Billings, MT
21	Kansas City, MO	13	Spokane, WA	2	Chicago, IL
21	Philadelphia, PA	14	Canoga Park, CA	2	Indianapolis, IN
21	Quebec City, QUE	14	Montreal, QUE	2	Newport Beach, CA
28	Rochester, NY	14	Westbury, NY	2	Oklahoma City, OK
28	Cleveland, OH	19	Syracuse, NY	9	Atlantic City, NJ
28	San Diego, CA	19	Vancouver, BC	9	New Orleans, LA
29	Portland, OR	20	Buffalo, NY	9	Toronto, ONT
30	Cincinnati, OH	20	Calgary, ALT	10	Columbus, OH
30	Milwaukee, WI	20	Omaha, NB	10	Winston-Salem, NC
MAY		21	Des Moines, IA	11	Phoenix, AZ
5	Boise, ID	21	Jacksonville, FL	11	Seattle, WA
5	Tulsa, OK	21	San Jose, CA	11	Stamford, CT
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CW/April 6

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'Adabas-M' Security Upgraded

RESTON, Va. — Adabas-M, the Software AG of North America, Inc. implementation of the Adabas data base management system (DBMS) for Digital Equipment Corp. VAX and PDP computers, has been enhanced to include data base protection and recovery features and a new logging system.

Adabas-M is a dictionary-driven DBMS utilizing value-based inverted and relational technology. The reentrant multithreaded Adabas-M Nucleus runs under the DEC RSX-11M, RSX-11M+, IAS and VMS operating systems.

Protection and recovery features include an automatic restart/recovery feature that the vendor said guarantees the physical integrity of the data base.

There also is a set of data base administration (DBA) utilities to save, restore and regenerate a system and protect it against disk head crashes and other failures.

The logging system provides asynchronous, multibuffered capture of compressed before-record images and compressed data base update transactions. Logging is a recycling disk journal, which supports concurrent archiving to permanent storage by a DBA utility.

The Adabas-M complete package is priced at $40,000. It can be leased on a one- to five-year basis, with monthly rentals from $1,800 to $800, from 11800 Sunrise Valley Drive, Reston, Va. 22091.

PXS Supplements EDX For IBM Series/1 Users

SAN FRANCISCO — The Program Executive System (PXS), a supplement to the EDX operating system for users of the IBM Series/1 minicomputers, is available from Alan Hochschild, Inc.

PXS manages application software much as the Series/1 operating system, EDX, manages system hardware, the vendor said. It performs functions that normally must be coded during application development or handled by an operator at execution time.

The system provides data base management, report writing, CRT terminal handling, calculation support, date arithmetic, sorting, primary and secondary indexing, automatic system initialization and file recovery, menu processing, program and utility chaining with interprogram communications, report spooling, virtual memory support and 3101 terminal support in the buffered mode.

With PXS, programmers can write programs using instructions addressed to a "logical executive," which carries them out by invoking service routines, analogous to subroutines, that have been prewritten and pretested.

To assist in debugging, a PXS subsystem called AID will trace an operating program and relate each instruction to the source code that called it.

A license for the complete development components of PXS is $1,250. An operations license is $1,250 per processor. Two program generators and a documentation system also are available as supplements to PXS.

The vendor is located at Suite 1411, 601 Montgomery St., San Francisco, Calif. 94115.

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System Keeps Utility Records

MINNEAPOLIS — A utility billing system designed to keep records of customer names and addresses, as well as services used by customers, is available from Lawson Associates.

Designed for water utilities, the software can be adapted to other companies offering services such as gas and electricity, the vendor claimed. In addition, the product allows individual customer meter information to be incorporated directly into the billing system.

The system automatically produces the initial water bills, plus past-due notices for each customer. The water bill is produced on a specific date, while the past-due and final notices are produced if the first statement is not paid within a specified time period, a spokesman said.

The price for the utility billing system is $20,000, the vendor said from 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Radio and TV System Offered for DG Users

HARRISBURG, Pa. — A radio and television broadcast business management system for Data General Corp. users is being offered by Midstate Computing Services, Inc.

The turnkey system, which can be purchased or leased, includes a co-op coding and billing system, an order/entry form which eliminates the need for a separately prepared computer entry form and a daily log which provides Federal Communications Commission compliance regulation data.

A voice/data communications link is provided between the support center and the Ultacom system, the firm said.

The costs for the system start at $41,500 from the firm, which can be reached through P.O. Box 1459, Harrisburg, Pa. 17105.

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Covers Major Exchanges

Rapidata Net Gains Stock Service

FAIRFIELD, N.J. — Rapidquote II, a data base service providing current and historic trading, financial and descriptive information on more than 32,000 securities traded on the major Nortn American exchanges, is available on Rapidata, Inc.'s time-sharing network.

Designed to meet the information needs of the investment professional, Rapidquote II provides over 12 years of daily historical price/volume information on common and preferred stocks, bonds, options and mutual funds.

Also included are complete dividend and stock distribution statistics for equity issues, bond interest payment data for debt issues and rankings and beta coefficients for use in analyzing risks associated with various securities.

The data base was developed by Capital Market Systems, Inc. and is updated daily from information provided by Telstat Systems, Inc.

Charges for Rapidquote II are based on standard computer resource usage costs, Rapidata said from 20 New Dutch Lane, Fairfield, N.J. 07006.

Multikey System Geared To Replace Prime's 'Midas'

PHOENIX — A multikey file management system has been developed by Database Systems Corp. as an alternative to Prime Computer, Inc.'s Midas, an Isam software package that runs on Prime's Series 50 system.

Named Fast, the system was designed to enhance throughput characteristics of Prime's interactive multiterminal, multitasking capabilities, according to the vendor spokesman.

It provides program logic for networking, multiterminal threading to the file structure and processing duplicate values.

Simultaneous Access

Simultaneous accessing of records by any number of users is allowed, and the locking of records for writing occurs only at the lowest possible level. Any of up to 199 keys can be specified as a unique value.

A compatible interface for all existing users of Prime's Midas is provided to allow current programs of either Cobol or Fortran to be used without recompilation.

Fast is available on a per-CPU license basis for $10,000. OEM and multiple-site discounts are available, the vendor said.

Database Systems Corp. is located at Suite 201, 1846 E. Camelback Road, Phoenix, Ariz. 85016.

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Access Offers Forecasting Tool For DG Systems

WELLESLEY, Mass. — A software package for minicomputers said to provide capabilities for computer-assisted forecasting, planning and analysis for business managers and scientists has been announced by Access Technology, Inc.

Supercomp can be used to develop detailed business plans including profit and loss, cash flow and balance sheet projections, the vendor claimed.

The package was designed to be run on most systems manufactured by Data General Corp., the vendor spokesman said.

Supercomp leases for $950 with annual updates and enhancements available from Access Technology, Inc., 103 Central St., Wellesley, Mass. 02181.

Tool Integrates 'Power' Into JCL

SPRINGFIELD, Mo. — Philinda Software, Inc. has announced a software package for IBM's Power/VSE that allows Power commands to be entered within the job control language (JCL).

Job control can be set up to automatically release or alter jobs or classes of jobs during job stream processing. This, the vendor claimed, relieves the operator from performing these functions.

The package is called Power-by-Batch and costs $95 from the vendor at 527 W. Kerr, Springfield, Mo. 65083.

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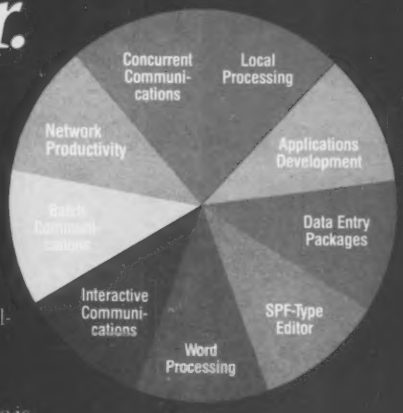

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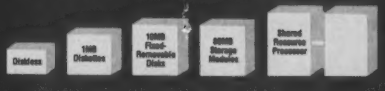

Now total the benefits: major host offloading, large reductions in resubmissions, nearly instant response times, far lower line costs, and most important, an enormous improvement in the productivity of data entry operators, programmers and network facilities.

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The new PTS/1200 product family consists of five controllers, ranging from a "diskless" model for simple network expansion tasks, to the large model shared resource processor, which provides non-stop local or distributed processing capabilities and storage capacity to 320 megabytes.

The hardware is needed to support the functions. Nine of them. Including stand-alone local processing in a multi-tasking mode. Applications development supported by powerful software tools. Four brand new data entry packages for transaction and batch entry. RAYCODE, our well-known SPF-type editor. RAYWORD, our word processing powerhouse.

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And four of the most comprehensive data communications capabilities in the industry. INTERACTIVE: 3270 bisynch, asynch, synchronous PARS and 3274-type SNA/SDLC, our 3270 bisynch features dual-upline, so any terminal can call two hosts. BATCH: 2780, 2780 multi-drop, 3780 and HASP bisynch, plus 3776 Mod 3 and 4 SDLC. NETWORKING: multi-drop 3270 downline support, point-to-point and TTY line concentration. And a level of CONCURRENT COMMUNICATIONS unmatched in the industry: 3270+3780, or 3274+3776, or BSC+SDLC, or SNA interactive+bisynch batch—on one controller.

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Mainframe-Level Capability

Mini-Based Cobol Introduced

SANTA CLARA, Calif. — A minicomputer-based Cobol compiler that reportedly provides mainframe-level business processing capability has been introduced by Convergent Technologies, Inc.

Convergent Cobol meets the American National Standards Institute's (Ansi) Cobol-74 standard at the General Services Administration's (GSA) low/intermediate level with extensions that enable users to employ the video capability of Convergent systems.

The indexed sequential access method (Isam) package introduced with the Cobol compiler provides single and multiuser random access to data identified by multiple keys.

The Sort/Merge facility supports both variable and fixed-length records. Multilevel sorts of up to 15 levels are possible.

The Convergent Cobol compiler is available for $2,500, while the Isam package is $3,000. The Sort/Merge facility is listed at $1,000. OEM volume discounts are available.

The vendor is located at 2500 Augustine Drive, Santa Clara, Calif. 95051.

Plycom Service Adds Accounts Receivables

PLYMOUTH, Ind. — Plycom Services, Inc. has added an Accounts Receivable System to its line of accounting software products designed specifically for a time-sharing environment running on Digital Equipment Corp. PDP-11 systems.

The software accommodates both open-item and balance-forward types of customers and provides for multidivision or multicompany corporations, the vendor claimed.

The package is priced at $7,000 and is available immediately from Plycom Services, Inc., P.O. Box 160, Plymouth, Ind. 46563.

Our users did it again... IDMS receives highest ratings in new Datamation survey

The judges, DBMS users, were tough. However, we've been hearing from our users all along that IDMS is the best system on the market for use with IBM hardware. In fact, IDMS is the only DBMS to make the Datapro honor roll four years in a row, and now the Datamation survey shows IDMS #1 again.

1980's survey was conducted jointly by Data Decisions and Beta Research. It was published in the December issue of Datamation and is the most comprehensive evaluation of off-the-shelf software ever compiled. Over 5,000 users of 161 different packages at over 4,700 sites were asked to rate their software with respect to features, functions, and performance. It was a tough competition, and IDMS came out the winner in the IBM category.

We're glad IDMS users feel the way they do. To find out why IDMS is so highly rated, attend the next free seminar in your area.

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Database Systems

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21	Kansas City, MO	29	Memphis, TN	12	Grand Rapids, MI
21	Philadelphia, PA	29	Portland, OR	12	Harrisburg, PA
21	Quebec City, QUE	29	Tulsa, OK	12	Madison, WI
23	Denver, CO	30	Milwaukee, WI	12	Tampa, FL
28	Cleveland, OH	**MAY**		12	Toledo, OH
28	Melbourne, FL	5	Roanoke, VA	12	Winnipeg, MAN
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CW/4-6

Accudata Offers Hospital Records On TI 990 Line

ATLANTA — Accudata, Inc. has introduced a Hospital Financial Computer System for Texas Instruments, Inc. 990 series processors.

The financial system is fully integrated throughout and has the ability to hold detail records of financial accounts indefinitely.

Other features include word processing features and the firm said it will announce an on-line medical records for inpatients package, a company spokesman said.

The basic package costs $25,000. The basic system with the on-line medical records package and an inventory package will be available in June and will cost $35,000.

Accudata is headquartered at Suite 1010B, 4488 N. Shallowfield Road, Atlanta, Ga. 30338.

Graphics Package Designs Offices

DENVER — Auto-Trol Technology Corp. has announced a graphics application system for the design and layout of office interiors.

Used in conjunction with Auto-Trol's AD/380 automated design and drafting system, the Facilities Management Design System enables a designer to interactively develop two- and three-dimensional interior layouts, as well as management reports.

The Facilities Management Design System costs $10,000, according to the vendor at 12500 N. Washington St., Denver, Colo. 80233.

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Despite Support Complaints

Users Give Net Processors High Scores

By Brad Schultz
CW Staff

DELRAN, N.J. — Many users consider vendor technical support for communications processors less than good, but a recent Datapro Research Corp. user poll also found several processor models rated good to excellent in overall satisfaction.

High marks in overall satisfaction went to unspecified Burroughs Corp. communications processors; Honeywell, Inc.'s Datanet 355; IBM's 3704 and 3705; Memorex Corp.'s 1270; NCR Corp.'s 3650 and unspecified NCR models. These processors garnered average scores of at least 3.5 on Datapro's usual subjective scale of four points for "excellent," three points for "good," two points for "fair" and one point for "poor."

Some vendors reaped high scores for one model, but low scores for another. In overall satisfaction, the lowest rating went to Honeywell's Datanet 6632, which averaged 2.3. The Datanet 6632 also ranked worst in throughput (2.3), worst in quality of vendor software (2.0), nearly worst in vendor technical support (2.3), but nearly best in hardware reliability (3.7).

The lowest rating in technical support went to Computer Communications, Inc.'s (CCI) CC-80 and CC-40 models, grouped together at 1.8. A score of 3.0 was the highest average in technical support given any model in the Datapro survey; tied at that not-so-lofty plateau were the Honeywell Datanet 355, IBM 3705, Memorex 1380 and NCR 3650.

Plurality Uses IBM

A clear plurality of the Datapro survey's 262 respondents uses IBM's 3705 — a communications processor family the vendor has just expanded, despite widespread speculation IBM is due to announce a replacement family to go with the emerging H series of mainframes. The 3705 copped a respectable 3.5 average in overall satisfaction and was also near the top in hardware reliability and promptness of maintenance. The family earned at least 3.0 averages in every category of evaluation.

IBM's 3704 communications processor family also pulled a 3.5 average in overall satisfaction and a 3.7 in reliability. Its lowest score, 2.8, came in technical support, but that still amounted to a tie for second

(Continued on Page 86)

Processor	Number of User Responses	Number of Units Installed	Average No. of Lines per Unit	Average No. of Terminals per Unit	User Ratings*															
					Overall Satisfaction					Ease of Installation					Throughput					
					WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Burroughs B 874	5	6	9	57	3.2	1	4	0	0	2.8	2	1	1	1	3.2	1	4	0	0
Burroughs, other models	3	3	57	63	4.0	3	0	0	0	4.0	3	0	0	0	3.7	2	1	0	0
Subtotals	8	9	27	59	3.5	4	4	0	0	3.3	5	1	1	1	3.4	3	5	0	0
CCI CC 8	4	7	37	202	3.3	2	1	1	0	2.5	1	1	1	1	3.3	1	3	0	0
CCI CC-80 & CC-40	6	18	89	633	3.3	2	4	0	0	2.5	1	3	0	2	3.6	3	2	0	0
Subtotals	10	25	68	460	3.3	4	5	1	0	2.5	2	4	1	3	3.4	4	5	0	0
DEC, all models	3	3	22	22	3.0	1	1	1	0	2.7	1	1	0	1	3.0	1	1	1	0
Honeywell Datanet 355	3	4	54	207	3.7	2	1	0	0	3.0	0	3	0	0	3.7	2	1	0	0
Honeywell Datanet 6632	3	4	32	96	2.3	0	2	0	1	3.0	1	1	1	0	2.3	0	2	0	1
Honeywell, other models	4	5	30	88	3.3	1	3	0	0	3.0	0	4	0	0	3.0	0	4	0	0
Subtotals	10	13	38	126	3.1	3	6	0	1	3.0	1	8	1	0	3.0	2	7	0	1
IBM 2701	3	3	3	3	3.0	1	1	1	0	2.7	1	0	2	0	3.0	1	1	1	0
IBM 3704	26	29	9	47	3.5	14	11	1	0	3.2	8	17	0	1	3.3	10	15	1	0
IBM 3705	92	114	45	365	3.5	49	38	4	0	3.1	25	51	13	2	3.4	46	39	4	2
Subtotals	121	146	36	288	3.5	64	50	6	0	3.1	34	68	15	3	3.4	57	55	6	2
Memorex 1270	17	25	25	79	3.6	11	6	0	0	3.2	6	9	2	0	3.4	6	10	0	0
Memorex 1380	3	3	100	122	3.0	1	1	1	0	2.0	0	1	1	1	3.7	2	1	0	0
Subtotals	20	28	36	85	3.6	12	7	1	0	3.1	6	10	3	1	3.4	8	11	0	0
NCR 3650	34	48	58	139	3.5	20	12	2	0	3.2	10	18	5	0	3.5	21	8	5	0
NCR 3670	21	38	170	408	2.9	9	8	4	0	3.1	4	14	2	0	3.6	9	11	0	0
NCR 3690	12	30	130	872	3.3	4	8	0	0	3.2	2	10	0	0	3.4	6	5	1	0
NCR, unspecified models	3	5	24	141	3.7	2	1	0	0	2.3	0	2	0	1	3.3	1	2	0	0
Subtotals	70	121	102	345	3.4	35	29	6	0	3.1	16	44	7	1	3.4	37	26	6	0
Periphonics T-Comm 7	3	3	15	1001	3.0	0	3	0	0	2.0	0	0	3	0	3.3	1	2	0	0
Sperry Univac, all models	5	11	61	224	3.0	2	2	0	1	2.8	2	0	3	0	2.8	1	2	2	0
All Others	12	18	28	98	3.1	3	7	2	0	2.8	3	3	6	0	3.2	5	5	1	1
TOTAL	262	377	54	276	3.4	128	114	17	2	3.0	70	139	40	10	3.4	119	119	16	4

	User Ratings*																			
	Hardware Reliability					Promptness of Maintenance					Quality of Maintenance					Manufacturer's Software					Manufacturer's Technical Support				
	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Burroughs B 874	3.6	3	2	0	0	3.2	1	4	0	0	3.0	1	3	1	0	3.4	2	3	0	0	2.2	0	1	4	0
Burroughs, other models	4.0	3	0	0	0	3.7	2	1	0	0	3.3	2	0	1	0	4.0	3	0	0	0	2.3	0	1	2	0
Subtotals	3.8	6	2	0	0	3.4	3	5	0	0	3.1	3	3	2	0	3.6	5	3	0	0	2.3	0	2	6	0
CCI CC-80 & CC-40	3.3	2	1	1	0	2.8	2	0	1	1	2.5	1	0	3	0	2.8	1	1	2	0	1.8	0	1	1	2
CCI CC-8	3.5	4	1	1	0	3.3	3	2	1	0	3.3	3	2	1	0	2.8	2	1	3	0	2.2	1	0	4	1
Subtotals	3.4	6	2	2	0	3.1	5	2	2	1	3.0	4	2	4	0	2.8	3	2	5	0	2.0	1	1	5	3
DEC, all models	3.7	2	1	0	0	2.7	1	0	2	0	3.3	3	2	1	0	2.8	2	1	3	0	2.2	1	0	4	1
Honeywell Datanet 355	3.7	2	1	0	0	3.3	1	2	0	0	3.3	1	2	0	0	3.0	0	3	0	0	3.0	0	3	0	0
Honeywell Datanet 6632	3.7	2	1	0	0	3.3	2	0	1	0	3.3	2	0	1	0	2.0	0	1	1	1	2.3	1	0	1	1
Honeywell, other models	3.0	0	4	0	0	3.3	1	3	0	0	3.3	1	3	0	0	3.3	1	3	0	0	2.0	0	1	4	0
Subtotals	3.4	4	6	0	0	3.3	4	5	1	0	3.3	4	5	1	0	2.8	1	7	1	1	2.4	1	3	5	1
IBM 2701	3.0	1	1	1	0	2.7	1	1	0	1	2.7	1	1	0	1	2.7	1	1	0	1	2.3	1	0	1	1
IBM 3704	3.7	19	5	2	3	3.3	10	15	1	0	3.1	8	15	2	1	3.0	3	19	4	0	2.8	5	16	4	1
IBM 3705	3.7	68	21	2	0	3.5	46	39	4	1	3.4	41	49	1	1	3.3	28	40	21	1	3.0	20	47	16	3
Subtotals	3.7	88	27	5	0	3.4	57	55	5	2	3.3	50	65	3	3	3.0	32	60	25	2	3.0	26	63	21	5
Memorex 1270	3.6	10	7	0	0	3.8	5	8	3	0	3.1	2	13	1	0	2.7	2	3	0	2	2.6	2	7	3	2
Memorex 1380	3.3	1	2	0	0	2.3	0	1	2	0	2.7	0	2	1	0	2.7	0	2	1	0	3.0	0	3	0	0
Subtotals	3.6	11	9	0	0	3.0	5	9	5	0	3.0	2	15	2	0	2.7	2	5	1	2	2.7	2	10	3	2
NCR 3650	3.8	27	7	0	0	3.5	17	13	1	0	3.4	16	12	3	0	3.1	11	15	8	0	3.0	12	9	13	0
NCR 3670	3.5	12	7	2	0	3.3	7	12	1	0	3.0	4	13	2	1	2.9	2	15	4	0	2.7	5	7	7	2
NCR 3690	2.6	4	6	2	0	3.0	1	10	1	0	3.0	1	10	1	0	3.3	5	6	1	0	2.5	2	3	6	1
NCR, other models	3.7	2	1	0	0	3.3	1	2	0	0	3.3	1	2	0	0	2.7	0	2	1	0	2.7	0	2	1	0
Subtotals	3.6	45	21	4	0	3.3	26	37	3	0	3.2	22	37	6	1	3.1	18	38	14	0	2.8	19	21	27	3
Periphonics T-Comm 7	3.7	2	1	0	0	3.3	1	2	0	0	3.3	1	2	0	0	2.7	0	2	1	0	2.0	0	1	2	0
Sperry Univac, all models	3.2	3	1	0	1	3.4	3	1	1	0	3.2	2	2	1	0	2.5	1	1	1	1	2.8	1	2	2	0
All others	3.5	6	6	0	0	3.2	6	2	2	1	3.1	5	3	2	1	2.9	2	4	3	0	2.8	3	3	3	1
TOTAL	3.6	173	76	11	1	3.3	111	118	24	4	3.2	94	136	21	5	3.0	64	124	52	6	2.8	53	107	76	15

*User ratings report the number of users responding Excellent (E), Good (G), Fair (F), and Poor (P) for each category. The weighted averages (WA) were calculated by weighting the four ratings on a 4, 3, 2, 1 basis.

Datapro Charts

Users' Ratings of Communications Processors

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'Datanalysis' Package Targets Optimum Data Compression

MACON, Ga. — One way to cut transmission costs is to transmit less, so the prudent data communications manager is ever on the lookout for practical techniques that "compress" data, getting things said with fewer bits to the byte or block.

Datanalysis, a software package from 4-Degree Consulting here, reportedly helps the user verify how compressed data can get with a given technique. Since any user with access to a well-stocked library of published algorithms can have many compression techniques to choose from, 4-Degree argues that software able to indicate which technique may be best for a given data base environment can simplify network management and lead to substantial savings on telephone bills.

Datanalysis goes for at least $750 for a single location operation, but can save many thousands of dollars in a data transmission budget, a 4-Degree spokesman claimed from 4736 Oxford Road, Macon, Ga. 31210.

PAIRED CHARACTER COMPRESSION ANALYSIS

PAIR/COUNT		PAIR/COUNT		PAIR/COUNT		PAIR/COUNT		PAIR/COUNT		PAIR/COUNT	
_I	156	TE	149	RI	110	UT	108	PU	96	_W	85
E_	80	TI	75	IN	75	_C	72	OR	70	_F	68
RE	68	N_	66	AT	66	MA	60	EN	59	SE	56
_D	55	AL	55	IR	53	FO	53	T_	52	O_	52
ON	50	L_	48	R_	46	D_	46	HA	46	S_	45
EN	45	SU	45	CO	43	AR	42	IS	40	_T	39
NT	39	LA	39	SI	38	_S	37	TH	37	AN	35
IT	34	_E	33	PA	33	TO	33	_R	33	HE	31
RA	30	MM	30	IA	30	TO	29	WE	29	ME	28
UB	28	LE	27	EQ	26	IM	26	H_	25	OU	25
AC	25	GR	24	CH	24	NE	24	_O	24	NU	24
LI	24	CT	23	OM	23	PR	23	ND	22	IL	22
TA	22	_P	22	DA	22	NA	21	_A	21	AI	21
NG	21	RO	20	MP	20	HS	20	AB	20	NO	19
CE	19	LY	19	RS	19	HC	19	YS	19	BE	18
RD	18	HG	18	IX	18	HI	18	HO	18	FI	18
IP	18	HU	18	ST	18	HQ	17	_B	17	DI	17
HW	17	HY	17	HK	17	HM	17	GO	17	_N	16
PI	16	CU	16	HD	16	G_	16	UE	16	UN	16
AP	16	EG	16	WO	16	CS	16	MI	15	ED	15
HN	15	EL	15	HH	14	PE	14	RR	14	TR	14
TS	14	HB	14	X_	14	HV	14	UR	14	G_	14
ES	14	OS	14	EP	14	HR	13	HF	13	HT	13

TOTAL COMBINATIONS FOUND: 4528

Sample Printout From 4-Degree's Datanalysis Package

POS Unit Offers RS-232 Link

ATLANTA — Software Sciences, Inc. is offering an asynchronous RS-232 or RS-422 CRT terminal with integral journal roll receipt printer and cash tray.

The Post 8000 point-of-sale (POS) terminal features a P31 green phosphor video display unit that is fully programmable for 24 lines by 80 characters, an alphanumeric typewriter-like keyboard with separate numeric keypad and special function key row, and self-test diagnostics, the vendor claimed.

The product costs $3,995, the vendor said from 2814 New Spring Road, Atlanta, Ga. 30339.

Processors Get High Scores

(Continued from Page 85)

place.

In contrasting how these processors are used, Datapro indicated that the model with the highest average number of attached terminals per unit was Periphonics Corp.'s T-Comm 7. Only three users of the Exxon Corp. affiliate's processor responded to the survey, noting an average of 1,001 terminals per unit, compared with 872, 408 and 365 terminals per unit for NCR 3690, NCR 3670 and IBM 3705, respectively.

As to average number of lines per communications processor, Datapro reported 170 lines per NCR 3670, 130 lines per NCR 3690, 100 lines per Memorex 1380, 45 lines per IBM 3705 and a 15-line average for the Periphonics T-Comm 7.

The Datapro survey of users' experiences with communications processors is available in the research company's annual "All About Communications Processors" report. The $15 report can be ordered from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

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Quadstar Credit Systems, Mini Host Run on Series/1

DALLAS — Quadstar Corp. has unveiled three products: Mini Host, to control automatic teller machines; the Credit Card Collection System (CCCS); and the Card Authorization System (CAS).

All were designed to work on IBM Series/1 computers.

With the Mini Host, transactions originated at ATMs can be intercepted and processed by the system or switched to one or more host processing centers, according to the vendor.

The price for a double CPU system is approximately $300,000, Quadstar said.

CCCS is a stand-alone, minicomputer-based system utilized to prompt collection of credit card overlimit and delinquent accounts. CCCS costs approximately $100,000 for a single CPU system, the firm said.

CAS is a dual Series/1 minicomputer system designed to support credit and debit card authorization. It interfaces to national credit card authorization networks and front ends a host CPU for inbound and outbound credit card transaction authorization, the spokesman said.

CAS costs approximately $100,000 for a single CPU system.

Quadstar Corp. is headquartered at Suite 145, 12700 Preston Road, Dallas, Texas 75230.

Racal Adds Six Options To 303 Protocol Translator

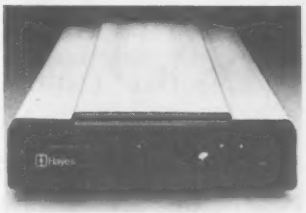
CHICAGO — Racal-Telesystems, Inc. has unveiled six protocol options for its 303 Protocol Translator, which reportedly permits cross-communication among DP and word processing equipment having different protocols and formats.

Users may now select up to 11 software options that reportedly enable word processors to originate and exchange information with mainframes, minicomputers, other word processors and intelligent printers over hard-wired or telecommunications lines.

Previously, the product offered compatible word processing among systems using Digital Equipment Corp., IBM OS/6, Lexitron, Inc., Vydec, Inc. and Wang Laboratories, Inc. equipment. Additional capabilities extend to IBM 6670 laser printer systems, as well as systems using Dictaphone Corp. 2000, CPT Corp., AM Jacquard Systems, Inc. asynchronous Ascii and bisynchronous Ebcdic.

The 303 Protocol Translator costs $8,350 and up from 410 N. Michigan Ave., Chicago, Ill. 60611.

Modem Handles Multilanguages



The Hayes Smartmodem

NORCROSS, GA. — A modem designed for use with RS-232C-compatible computers or terminals, and which can reportedly be program-controlled in any language by Ascii character strings, is available from Hayes Microcomputer Products, Inc.

The product analyzes and executes commands and in response sends result codes which, at the user's discretion, can be English-like words or decimal digits, the vendor claimed.

The modem can be connected to any telephone in the U.S. via either Touch-Tone or pulse dialing, a spokesman said.

The modem costs $279, the vendor said from 5835 Peachtree Corners East, Norcross, Ga. 30092.

Centigram Terminal Gives Voice Output

SUNNYVALE, Calif. — A voice-output terminal designed to provide high quality digital speech and extensive vocabulary at low bit rates is available from Centigram Corp.

The Logically Integrated Speech Annunciator (Lisa) operates at 4,800 bit/sec and thus reduces the cost of storage and transmission lines, the vendor claimed, and said 1M byte of disk storage equals one hour of speech.

The single-unit price is $3,450, Centigram said from Suite 108, 155A Moffett Park Drive, Sunnyvale, Calif. 94086.

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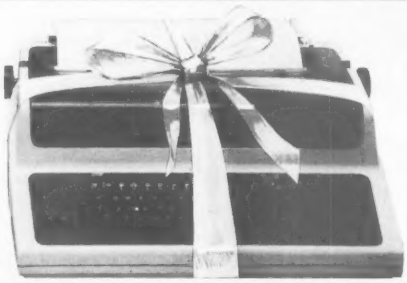

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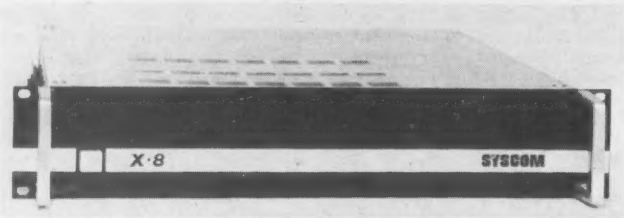
System Gives Messages Via Phone, Telex, TWX



The Syncom Message Master

SUNNYVALE, Calif. — A distributed communications system that reportedly interfaces with direct-dial telephone lines, TWX, telex, international telex and leased lines is available from Syscom, Inc.

Depending on the system selected, eight or 32 lines can be in use simultaneously, at bit/sec rates of 50 to 9,600, according to a company spokesman.

The Message Master Features a store-and-forward capability with a 64K-byte character buffer, expandable to 256K bytes.

With this feature, messages can be stored in batches and busy numbers can be automatically redialed, the spokesman said.

The eight-port model starts at $20,000 and the 32-port model $49,750, the vendor said from 470B Lakeside Drive, Sunnyvale, Calif. 94086.

DCA Includes X.25 Link In System 355 Processor

NORCROSS, Ga. — Digital Communications Associates, Inc. (DCA) has incorporated the X.25 packet network interface into its System 355 Master Network Processor.

The DCA X.25 interface is used in two applications: To interface a DCA Integrated Network Architecture (INA) private network to a packet-node host computer with X.25 protocols, and to interface an INA network to an X.25 (public) packet-switched network, such as Telenet, Tymnet or Datapac.

The interface consists of a single module that plugs into a card-file slot of the System 355, thus affording easy installation, the vendor spokesman claimed.

The product will be priced at $1,000 until the end of June, at which time the price will double to $2,000, the vendor said from 303 Technology Park, Atlanta, Ga. 30092.

Daisy Wheel Printer Utilizes RS-232C EIA Interface

LOS ANGELES — A 40-char./sec daisy-wheel printer utilizing the industry standard RS-232C Electronics Industries Association (EIA) communications interface is available from C. Itoh Electronics, Inc.

The addition to the company's Starwriter line features a 96-char. print wheel and a format that accommodates multilingual applications, the vendor claimed.

The printer also produces letter-quality printing with either 136 columns in pica pitch or 163 columns in elite pitch, the vendor said.

The daisy-wheel printer with serial interface is priced at $2,508 with quantity discounts available from C. Itoh Electronics, Inc., 5301 Beethoven St., Los Angeles, Calif. 90066.

Prentice Statistical Multiplexers Meet Custom Net Requirements

SUNNYVALE, Calif. — Prentice Corp. is offering three statistical multiplexers designed to meet a variety of custom data network requirements with a standard, off-the-shelf product line.

The Minimux was designed for point-to-point multiplexing. The Unimux is used as an asynchronous to synchronous converter with error correction, and the Multimux reportedly provides statistical multiplexing capabilities for multipoint circuits, the vendor said.

Each unit is microprocessor-controlled, offers automatic request for repetition (ARQ) data link error correction and provides aggregate rates up to 9,600 bit/sec and channel rates up to 9,600 bit/sec, according to the vendor spokesman.

Pricing for the Unimux starts at $895; for the Minimux, $1,150 and the Multimux, $1,650, the vendor said from 266 Caspian Drive, Sunnyvale, Calif. 94086.

Correction

For more information on the Polynet local network system announced by London-based Logica VTS Ltd. [CW, March 23], contact Logica, Inc. at 341 Madison Ave., New York, N.Y. 10017.

Rivals VAX at Lower Cost

Harris Adds Mid-Range 48-Bit Mini

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division has introduced a 48-bit minicomputer system that is said to offer more than double the performance of Digital Equipment Corp.'s VAX-11/780 and similar 32-bit machines, but at lower cost.

The Harris 300 system features up to 2M bytes of real memory and more than 12M bytes of virtual memory, plus an optional scientific arithmetic unit (SAU) that was designed to support floating-point and certain other operations independent of the central processor, a spokesman said.

The computer also supports up to 80M bytes of Winchester-type disk storage and can handle up to 48 interactive CRT terminals.

Like its four 48-bit system predecessors — the Harris 80, 100, 500 and 800 computers — the mid-range H300 machine functions under the firm's Vulcan operating system software.

Under Vulcan, users can perform concurrent multistream batch processing, interactive time-sharing, data base management and transaction processing functions, the spokesman continued. The recent superminicomputer addition is also reportedly fully compatible with all of its system peers.

Typical Applications

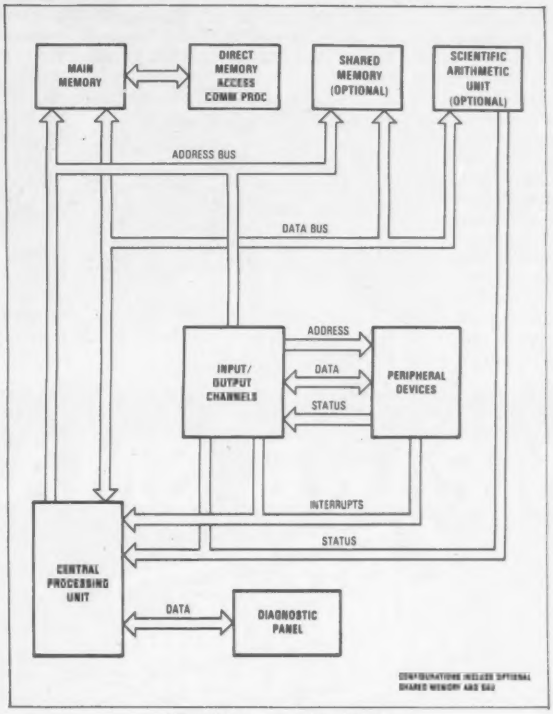
Basically, the H300 is geared for high-performance scientific, engineering and business applications, particularly those that require multiple languages and a multitude of users.

To handle this work load, the system's CPU has 48 lines for data transfers and 20 lines for addressing. The address bits allow up to 1.96M bytes of main memory to be accessed by any subsystem using the bus, the spokesman said.

To save time, the H300 CPU overlaps instruction fetches with executions. While one instruction is being executed, the next sequential instruction is being fetched from main memory, he explained. This instruction set is reportedly compatible with the other 48-bit systems up and down the Harris line.

Although the H300's 2M-byte maximum memory and 12M-byte virtual memory is the same size as that of the VAX-11/780, the 48-bit computer has an effective memory access time that is about 27% faster than DEC's machine. The H300's access time is rated at 290 msec, while the VAX clocks in at about 400 msec, the spokesman noted.

As for performance, the H300 with its optional SAU is rated at 677 in Whetstone tests and the VAX, which does not offer the user a scientific accelerator, comes in at an average of 277. Basically, the SAU provides concurrent floating-point operations independent of the CPU and transfers bit chunks to and from main memory on the system bus.



H300 Major Functional Units

Other features include a universal block channel (UBC), which is a direct memory access channel for high-performance peripheral controllers for disks and magnetic tapes; an integral block channel (IBC), which is a direct memory access channel for a card reader; and a direct memory access communications controller processing (DMACP) for interfacing various terminals to the system.

In addition, there is an integral block channel (IBC) for in-

(Continued on Page 90)

M8210 Memory Board for VAX Replaced

By Plessey Peripheral . . .

IRVINE, Calif. — Plessey Peripheral Systems has announced a 256K-byte add-in memory for Digital Equipment Corp. VAX-11/780 processors.

Designed as a direct replacement to DEC's M8210, the Plessey board, called the PM-S780, is hardware- and software-compatible with the VAX-11/780 memory subsystem, Plessey claimed.

The data word pattern of Plessey's board is 32K words by 72 bits — 8 bytes data plus 8 ECC bits, ensuring accurate ECC operation, the vendor spokesman claimed.

The board costs $1,770 from Plessey, which is headquartered at 17466 Daimler, Irvine, Calif. 92714.

. . . And Cambex Corp.

WALTHAM, Mass. — Cambex Corp. is offering a single-board 256K-byte add-in memory for main memory expansion of Digital Equipment Corp's. VAX-11/780 computer.

Cambex's VA-780 features full ECC compatibility and uses 16K-byte dynamic random-access memories (RAM) organized as 32K by 72 bits to provide 256K bytes.

The VA-780 is a direct replacement for DEC's M8210 main memory board. It is both hardware- and software-compatible with the host VAX-11/780 memory controller, which determines operating speeds.

Prices start below $1,900, the vendor said from 360 Second Ave., Waltham, Mass. 02154.

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	RL211-AK	KDF11-AD,HD,
FP11-A	RL01-AK	HF,HH,HK
MS11-LB	RL11-AK	DR11C
MS11LD	RLV21	MR11EA
MSV11DD	RLV11	VT103-AA,BA

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Mid-Range 48-Bit Mini Rivals VAX at Lower Cost

(Continued from Page 89)

terfacing slow-speed devices to the system and a buffered block channel (BBC), which is designed to aid the UBC and to improve transfer rates.

Software languages offered on the H300 system include Fortran 77, Cobol, Extended Basic, APL, RPG II, Harris' Macro Assembler, Pascal and other common languages. In short, the system supports nine computer languages, five support programs, a programmable job control language and a variety of remote job entry (RJE), data management and utility packages, the spokesman remarked.

On the communications side, the system can support Control Data Corp., IBM and Sperry Univac RJE protocols, as well as IBM 2780, and Hasp II multileaving terminal protocols.

The system also has an IBM 3270 emulation software package.

Offered as a packaged system with 192K bytes of error-correcting memory, CRT terminal console, built-in 80M-byte disk and nine-track 1,600 bit/in. tape units, the H300 costs $104,950 — which is about $30,000 to $35,000 less than the basic VAX price.

Harris' Computer Systems Division is at 2101 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

3M Brings Out Camera And Reader/Printer

ST. PAUL, Minn. — 3M Corp.'s Micrographic Products Division has introduced a multiple-blip-format 16mm microfilm camera for electronic filing and a microprocessor-controlled, multiple-blip-format Page-Search reader/printer with diagnostic self-checking.

The EF 5000 camera can accept up to 90 documents per minute. Filming is on a 4,000-frame cartridge of 16mm film. The camera costs $7,500.

The EF 6000 Page-Search reader/printer accepts cartridge or open spool microfilm on any microfilm camera in a variety of filming formats. There are seven different search modes for image retrieval, and it allows pushbutton production of copies on 3M Dry-Silver paper.

The EF 6000 is available for $9,250. The vendor may be reached through P.O. Box 33600, St. Paul, Minn. 55133.

Prime CPU Now Runs IBM 1403

LOS ANGELES — Spur Products Corp. has introduced a controller that enables a Prime Computer, Inc. computer to operate an IBM 1403 impact line printer.

The controller performs all the logic, memory, power and control functions for the IBM 1403 printer, which has advantages of interchangeable type trains, print quality, dependability and lower cost, according to the firm.

Cost of a remanufactured 1403-N1 printer, which prints 1,100 line/min, is $12,000 when purchased from Spur. The S1403/Prime controller costs $20,125. The S1403/Prime controller comes complete in a standalone enclosure and includes all logic cards, memories and operator training.

Spur is located at 1904 Centinela Ave., Los Angeles, Calif. 90025.

MSI Announces Price Hikes

COSTA MESA, Calif. — MSI Data Corp. has announced a 5% increase in the prices of its seven principal models of portable, hand-held data entry terminals.

The price increases also apply to the firm's memory upgrade kits for the terminals but not to software products, associated data communications devices, receiver products or other MSI products or services.

The increases, necessitated by "continued increases in the company's overhead and expenses," affect the MSI/66, MSI/77, MSI/88, MSI/88d, MSI/88e, MSI/88e-a and MSI-88f. Prices now range from $350 to $2,700 per unit, depending on memory size.

MSI is headquartered at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Terminal Geared To T/S Tasks

CUMBERLAND, R.I. — The Digitronics Division of Comtec Information Systems, Inc. has announced the Alpha-verter Model 500, a batch data entry terminal that offers full alphanumeric capabilities, programmability, two-way communications capabilities and optional external forms printer and interactive modes for time-sharing applications.

The unit comes in a self-contained package including a 56-key typewriter, imbedded keypad, five-by-seven dot matrix printer, magnetic cartritape for recording and built-in telecommunications, the vendor said.

The Alpha-verter costs between $2,995 and $4,090, the vendor said from 53 John St., Cumberland, R.I. 02864.

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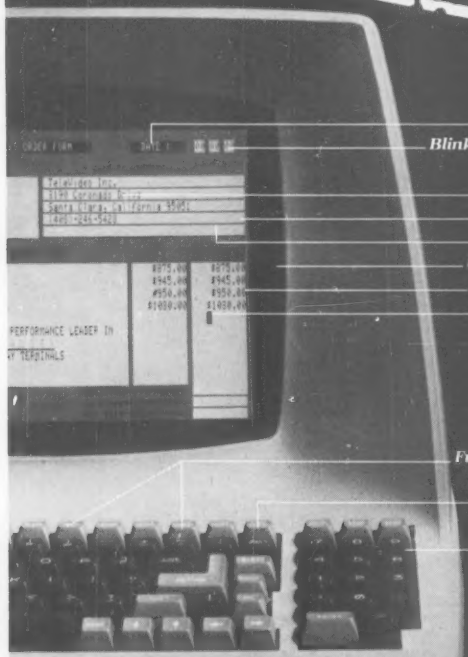

Model 920C shown.

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Includes Upward Compatibility

TI Expands Low End of DS990 Line

DALLAS — Texas Instruments, Inc. has expanded its DS990 minicomputer systems line by adding a low-end multiuser computer that provides program, file and memory management capabilities as well as upward compatibility to larger DS990s.

The Model 3 computer includes TI's 990/10 central processor with 96K bytes of error-correcting memory, a Model 911 CRT terminal and a dual CRT terminal controller. Mass storage is available in two forms: in dual double-sided double-density diskettes with 1.5M bytes of storage each or a cartridge disk with 4.7M bytes of removable and 4.7M bytes of fixed storage.

The Cobol-based system utilizes TI's DX7 operating system, which is upwardly compatible with TI's more advanced DX10 executive system software, a spokesman said. In a memory environment of 96K bytes, the Model 3 provides a minimum of 30K bytes of user memory space and lets up to two terminals execute Cobol programs concurrently.

Model 3 systems with the cartridge disk are equipped with a table-top cabinet that houses a six-slot chassis and the 990/10 processor. Systems with diskette storage can be equipped with the table-top cabinet or a 30-in. pedestal unit that provides a 13-slot chassis, the spokesman continued.

TI's Model 3

Optional Disks

The former configuration can be expanded with an optional third and fourth diskette drive or a second DS10 cartridge disk drive. A Model 810 printer, 990 communications support hardware for an external synchronous modem and a second Model 911 CRT terminal. Additional memory, more workstations or a second printer can be added by upgrading the system's chassis and attaching the pedestal cabinet, the spokesman noted. However, the 13-slot model can handle up to three additional CRT terminals, up to four diskette drives, two printers, up to 256K bytes of memory, two cartridge disk drives and 990 communications support hardware.

The DX7 operating system provides Cobol program development and execution, IBM 3780/2780 communications emulation and system generation capabilities, the spokesman continued. As an interface between the operator and the operating system software, the computer includes a system command interpreter (SCI). The SCI commands are reportedly functionally identical with those implemented in the DX10 operating system. Capabilities provided by the SCI in DX7 include roll-in, roll-out, dynamic memory allocation of overlays, priority scheduling and procedure and replicated-task sharing.

The DX-7 Cobol compiler conforms to the Ansi Cobol subset as defined in Ansi document X3.23-1974 and incorporates the subset's extensions, the spokesman added.

Finally, the Model 3 computer's 3780/2780 emulator provides communications to DS990 and other computer systems. Data files can be transmitted over leased point-to-point or switched telephone lines at speeds up to 9,600 bit/sec.

The basic Model 3 minicomputer system ranges in price from $15,700 to $21,700. The firm may be reached through P.O. Box 202146 H-573, Dallas, Texas 75220.

Mini Bits

LSI-11 Troubleshooting Unit Runs Analysis in 15 Minutes

SAN DIEGO — A portable, self-contained test instrument said to troubleshoot a complete Digital Equipment Corp. LSI-11 system in 15 minutes has been announced by Electro-Design, Inc.

The CAS-11 allows the user to fully activate the system under test, including the operating mode of the CPU, with minimum performance degradation within the system, the vendor claimed.

The CAS-11 is priced at $4,650 and is available from Electro-Design, Inc., 7364 Convoy Court, San Diego, Calif. 92111.

Kit Converts Single-Sided To Double-Sided Diskettes

SAN DIEGO — A kit that reportedly allows owners of 5-in. single-sided diskettes to convert those to double-sided disks is available from Beals Agency, Inc.

The kit takes advantage of the magnetic coating disk manufacturers place on both sides of their disks, even though they provide read- and write-protect openings on only one side of the disk, the vendor claimed.

The kit is priced at $6.95 plus $1 postage from Beals Agency, 4141 Fairmount Ave., San Diego, Calif. 92105.

'Octo-Density' Disk Drive Runs on Chieftain Series

WESTLAKE VILLAGE, Calif. — Smoke Signal Broadcasting has announced an "octo-density" 5.25-in. flexible disk drive on its 6809 series of Chieftain small business computers.

The drive offers 1M byte of formatted storage and costs $4,075.

The vendor is at 609 Deep Valley Drive, Palos Verdes, Calif. 90274.

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We save you space. The monitor of our 2078 can be removed from its stand and put on a shelf or bookcase for more room at your workstation. And since the 2078 weighs just 55 pounds (including keyboard), it's easily portable.

You can save even more space with our 2076. It supports up to 8 display stations and/or printers up to 4920 feet away—yet it's small enough to fit under the pedestal of a desk. One 30-pound 2076 can control Models 1 through 4 of our 2078—so you'll never have to worry about upgrading when you add larger screen sizes.

We save you energy. Our 2078 consumes less power and generates less heat than many other display stations on the market. There's even an automatic dimming feature that prevents screen burn and extends CRT life.

We save your operators from discomfort. You've probably read that many CRT operators complain of eye strain, back pain and other discomforts from working on display stations that have not been "ergonomically designed." Our 2078 helps solve the problem. It's been designed with a tiltable, fingerprint-resistant screen that allows for sharper image contrast. And it's been convenience-engineered with features that help insure operator comfort, improve productivity and lessen chance for error.

We save you money. Add it all up. You save space, you save energy and you save your operators from discomfort. You also save time—because both the 2078 and 2076 are available now. The bottom line? You save money.

There are other ways Memorex re-defines savings with the 2078 Display Station and 2076 Remote Cluster Controller. For all the information on the Memorex family of terminal controllers, communications processors, display stations, controllers and printers, call: Laurie Schuler at (408) 996-9000. Or write Memorex Communications, 18922 Forge Drive, Cupertino, California 95014.

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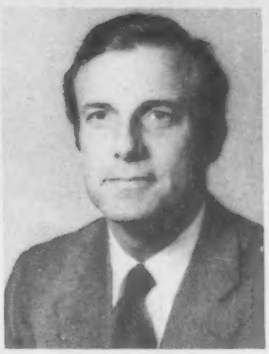
Richard L. Gehring



Joseph J. Kroger

Kroger Replaces Gehring As President of Univac

NEW YORK — Joseph J. Kroger has been named the president of Sperry Univac, replacing Richard L. Gehring who has assumed a corporate-level position involving strategic planning.

Kroger was formerly president of Sperry Univac's Marketing and Services Division.

Gehring, who is an executive vice-president of Sperry Corp., is a member of the Office of the Chairman and will report directly to corporate Chairman and Chief Executive Officer J. Paul Lyet.

Univac is Sperry Corp.'s largest division. For its fiscal year ended March 31, the computer division produced revenues in excess of $2.7 billion, nearly half of corporatewide revenues of $5.6 billion.

Sperry Univac currently has an installed base of computers valued at more than $12 billion, the firm said.

Announcing the executive changes, Lyet said, the firm had "experienced compound annual growth rates in revenues of 14%, in profits before taxes of 21% and the value of the computer base in excess of 10%."

Future of PCMs Linked To End-User Attitudes

SAN JOSE, Calif. — The success of the plug-compatible mainframe (PCM) manufacturers over the next few years will greatly depend on prevailing end-user attitudes, according to Creative Strategies International (CSI).

The California-based market analyst also forecast the worldwide market for all IBM and IBM-compatible mainframes to reach $46 billion by 1985, of which $21 billion is expected to come from the demand for small-scale mainframes ($100,000 to $3 million in price). CSI said the demand for large-scale mainframes (costing over $3 million) should result in revenues exceeding $25 billion.

In its latest industry report on "Plug-Compatible Mainframes," CSI said IBM's mainframe strategy for the 1980s has not yet fully unfolded and the company is still stretching out the value of its older systems. IBM's formal position on PCM competition and mainframe price/performance trends is, to the end users, noticeably unclear, leaving many of them perplexed and cautious.

(Continued on Page 102)

Government Contracts: The Thrill of Victory

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Contrary to popular wisdom among many DP vendors, selling to the government is not only profitable but is also interesting, challenging and all-around good sport, according to one Washington consultant.

"This is an interesting game . . . it's a fun business," said Terry Miller, whose outlook on government sales seems akin to that of people who think of barroom brawls as whacking good fun.

Miller, president of Government Sales Consultants, Inc. and noted expert on the subject, told a recent meeting of the Computer Law Association that "the government is so full of money, and buys so many computers and so much software . . . that anyone, if he makes enough sales calls, can do reasonably well."

The first step, Miller, said, is to persuade the home office to relent from its traditional bias toward commercial sales.

"The home office myth," as Miller put it, is that there is too much red tape involved in dealing with federal agencies, that sales take too long and are too hard to get and that profit margins are too low.

But, he argued, companies with a real commitment to gov-

(Continued on Page 104)

PE, NCR Establish New Divisions

• *PE Eyes Commercial*

OCEANPORT, N.J. — Paving the way for more emphasis on the commercial sector of the computer market, Perkin-Elmer Corp. has formed a Business Systems Division.

In particular, PE will target its 32-bit minicomputers to the commercial market, according to Gary Doniger, director of marketing for the new division.

Until now, PE's marketing was lumped under the Computer Systems Division. That division has now essentially been split into two specialized units, the Business Systems Division and the Technical Systems Division. Currently, the majority of PE's minicomputer sales is to the scien-

(Continued on Page 96)

• *NCR Eyes OEMs*

DAYTON, Ohio — Although until now virtually all of its sales have been to end users, NCR Corp. recently established an OEM Marketing Division, which reports directly to the company's Executive Office.

The new division, established less than one month ago, consists of three programs: the Software Liaison Program, the NCR Authorized Distributor Program and the Value-Added OEM Program.

The move is a commitment by NCR to develop alternate channels of distribution, said division Director Roger P. Nielsen, who was formerly the manager of federal marketing for Data General

(Continued on Page 96)

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VAX family compatibility.

Despite its size and price, the VAX-11/750 is *totally* software compatible with the larger, faster VAX-11/780—the computer that has been setting performance standards ever since its introduction.

It has the same kind of real-time response. The same 32-bit addressing. The same powerful instruction set. The same two billion bytes of user program space.

And the VAX-11/750 runs the same VAX/VMS™ Performance Software, already proven in thousands of VAX-11/780 applications.

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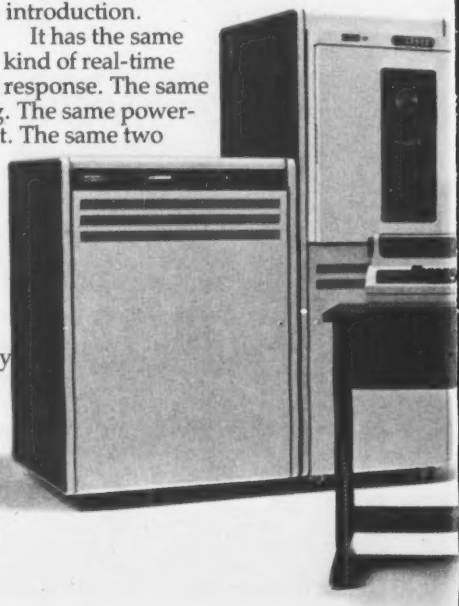
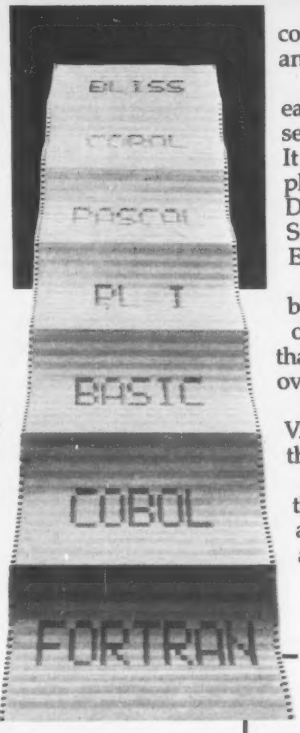


VAX-11/750.

optimizing FORTRAN that is a full ANSI 77 implementation. A high-speed COBOL based on current and anticipated ANSI standards. A PL/I in the same performance class as VAX FORTRAN. Plus highly interactive BASIC, PASCAL, CORAL and BLISS.

Because the VAX-11/750 offers total family compatibility with the VAX-11/780, you can run all your application programs on either system. Using the same data management facilities that include sequential, random and multikey ISAM. FMS for screen formatting. DATATRIEVE for query and report writing.

And to make system performance complete, Digital is introducing its own RM80 Winchester disks, the latest in mass storage technology.



Distributed VAX power.

The VAX-11/750, combined with Digital's commitment to network leadership, adds a new dimension to distributed processing.

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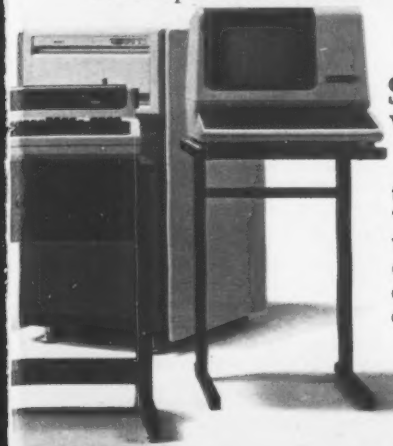

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The VAX-11/750 is the industry's first 32-bit "minicomputer" designed with custom LSI gate array circuits. This advanced circuitry means fewer components, lower power consumption, easier maintenance, and higher overall reliability.

In fact, the VAX-11/750 is one of the easiest computers to maintain and service that has ever been developed. It can even be diagnosed over telephone lines from Digital's Remote Diagnostic Center in Colorado Springs and from two centers in Europe.

And VAX computers are supported by Digital's worldwide service organization, with more than 14,000 people in over 400 offices.

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We change the way the world thinks

Burroughs Expects Dip in First Half

DETROIT — Burroughs Corp. expects earnings for the first half of this year to compare unfavorably with earnings during the first half of 1981, Chairman and Chief Executive Officer W. Michael Blumenthal told shareholders at the annual meeting held here recently.

While the outlook for the first half of the year is not rosy, Blumenthal said the second half of the year will show "positive growth over the corresponding operational figures for the same period last year prior to the 1980 special charges."

Last year Burroughs had special charges of $125 million and ended its fiscal year with earnings of $81.9 million, down dramatically from 1979's earnings of $305.5 million [CW Feb. 2].

Blumenthal cited the recent strength of the U.S. dollar abroad and a softening in a number of European markets as factors in the projections for the first half.

Although Blumenthal would not be more specific about earnings projections, he pointed to milestones taken in 1980 to strengthen the company.

In particular, he talked about the company's equipment staging centers where computers are assembled as complete systems and checked out prior to shipment to customers. He also cited the company's effort to develop a new system of financial reporting and management controls.

In commenting on the future direction of the company, Blumenthal said office automation is "perhaps the most widely recognized growth area for the 1980s." In January the firm established a framework for its office automation strategy by setting up an Office Systems Group.

As part of its recovery program, Burroughs recently laid off 430 workers at five of its plants located in Detroit, New Jersey and California.

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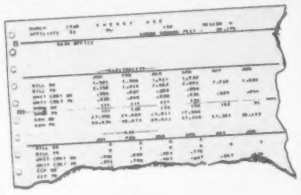

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Memorex Loss Could Hit $13 Million

SANTA CLARA, Calif. — Memorex Corp. said it will report a loss for its first quarter that will be in the range of $8 million to $13 million before taxes.

That loss will exceed the losses incurred in either of the last two quarters of the company's prior fiscal year, according to C.W. Spangle, the firm's chairman and chief executive officer.

Although Spangle noted that first-quarter revenues are traditionally weak, he noted the loss was also due to production problems related to some of the company's large disk systems and "slower than anticipated development of the market for 8-in. rigid disk drives."

Other factors contributing to negative bottom-line results are the strengthening of the dollar against major European currencies and start-up costs associated with packaging and production processes for the firm's consumer products.

During fiscal 1980, Memorex reported total revenues of $768.6 million and a loss of $28.9 million. Third- and fourth- quarter losses totaled $5.6 million and $2.8 million, respectively.

Nickels & Dimes

Transducer Systems, Inc. has declared a quarterly cash dividend of 2 cents per share on its common stock. The dividend is payable on April 10 to shareholders of record on March 27.

$ $ $

Datum, Inc. announced 1980 earnings of $258,000 or 14 cents per share, compared to earnings of $200,000 for the prior year. Revenues for 1980 were $14,919,000 compared to the prior year's $15,233,000.

$ $ $

Applied Materials, Inc. reported sales of $18,063,000 for the three months ended Jan. 25, an increase of 35% over the $13,373,000 reported for the comparable period a year ago.

$ $ $

Bold Beranek and Newman, Inc. has called a special meeting to consider a proposal by the board to increase the authorized capital stock of the company. If the increase is approved by shareholders, the board has authorized a three-for-two stock split of the common stock of the company, to be effected by means of a 50% stock dividend. The dividend would be payable May 1 to holders of record on April 16.

PE Division Eyes Commercial User

(Continued from Page 93)

tific market.

Heading the Business Systems Division is Martin C. Waters. Waters previously headed PE's United Kingdom Software Development Center, which developed the company's Reliance software used for commercial transaction processing.

In a related move, PE named David I. Caplan general manager of the Technical Systems Division. He will oversee the company's efforts in the industrial, scientific, simulation and computer-aided design and manufacturing sectors.

David G. Moore Jr. continues as vice-president of Computer Operations.

NCR Seeking New Channels

(Continued from Page 93)

Corp.

As the cost of hardware has dropped, vendors are increasingly seeking effective channels of distribution, Nielson stressed, noting some of NCR's small business systems and terminals are well-positioned for OEM sales.

The Software Liaison Program will attempt to interest software houses in developing or adapting software applications for use on NCR equipment. By cataloging the software available for NCR systems, Nielson noted smaller firms will obtain a wider distribution for their products.

The other two parts of the division are aimed at distributing certain hardware products. Through its Authorized Distributor Program, NCR will sell its 8100 series small business systems and its 2950 intelligent terminal. Third-party vendors selling these products will be given discounts competitive with the industry based on a negotiated quota commitment.

The OEM Value-Added Program will concentrate on sales of the company's interactive I-8200, I-8400 and I-8500 systems. Ideally those vendors participating in this portion of the program will already have software applications geared to specific vertical markets, but need hardware for a complete system, Nielsen explained. Discounts to these vendors will be negotiated on an annual forecast basis.

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Offering 720 x 256 resolution, the 3500 can represent data as mathematical functions, frequency response curves, spectral response, and bar charts or graphs. The graphic option also provides labeling capability on an x or y axis. Its separate memory allows standard text and graphic figures to be superimposed. Hard copy via a Perkin-Elmer thermal printer offers the same resolution for graphic figures, and functions as a line or page printer.

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To Reduce Cost of Solutions

Intel Plans to Marry Hardware, Software

By Lois Paul
CW Staff

AUSTIN, Texas — The technological focus of the '80s is on reducing the cost of solutions, and Intel Corp. will work toward that goal by effecting a marriage between hardware and software products and by increasing productivity with solutions driven down to the user level, according to Al E. Sisto, marketing manager of Intel's commercial software systems operation.

Addressing the Association of System 2000 Users for Technical Exchange (Astute) here recently, Sisto said data base management systems (DBMS) are a vital part of this strategy, particularly Intel's System 2000/80.

Some of the problems users will experience in the '80s will be increasing application backlog, spiraling cost of professional personnel, increased need for management productivity and an insatiable demand for information, he said. Organizations will be increasingly distributed geographically while, at the same time, being integrated functionally, he added.

Intel wants to provide application development tools that will provide a marriage between its system technology (acquired with MRI Systems Corp. two years ago) and its silicon technology, he said.

'The company intends to create products which will provide information control across the corporate, functional (distributed data base) and operational (end-user, department level) tiers of data.'

Other proposed Intel solutions involve channeling centralized environments to distributed ones and integrating systems for specific applications, he said.

The goal, Sisto explained, is to unleash the power of shared information and to increase access, while still maintaining control. Intel proposes to accomplish this by bringing information access down to the microprocessor level.

Within the '80s, the company intends to create products which will provide information control across the corporate, functional (distributed data base) and operational (end-user, department level) tiers of data, he said.

According to Sisto, Intel is looking at ways to reduce the need for system programmers to meet the demand for information by providing end users with network management, software development and corporate support. This will give the people experiencing the problems the tools to solve them, he said.

Planned for the '80s are a transaction controller, which will be a general-purpose small business computer supporting multiple terminals; a common data development language that will run though a distributed data base product at the host; and an electronic file base, a special-purpose microprocessor-based system component with data base management functions and cycles which connects as a back end to the small hosts and fits in the local network.

Regarding the timing of these new product introductions, Sisto said, "I look to delivering these solutions in the early '80s." He described the rumors of an impending "System 3000" as part of the "ongoing folklore," noting that within the past several years this name has represented a number of different Intel Products.

Ochel Resigns From Intel

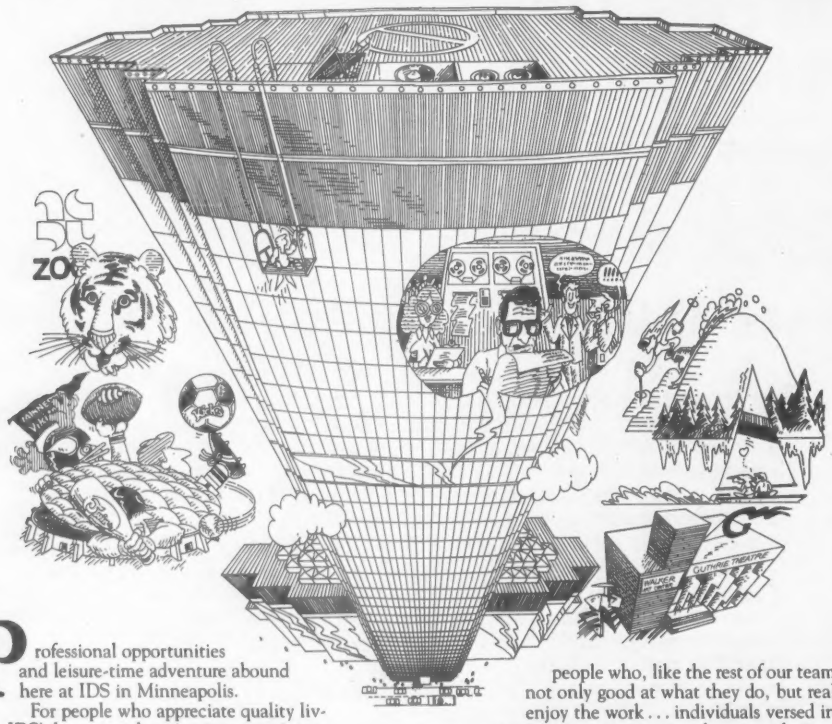
AUSTIN, Texas — Kent A. Ochel, general manager of Intel Corp.'s commercial software systems operation, has left the company to go into private business, according to Raymond Crane, vice-president of the company's commercial systems division. Replacing Ochel as acting general manager is Dan Davis.

Crane announced Ochel's departure at the Association of System 2000 Users for Technical Exchange (Astute) meeting here recently. He added that the transition began in January when Ochel raised the possibility of his leaving the company.

"For the first two years after the acquisition of MRI Systems Corp., the division was what I would classify as an investment," Crane said, adding that "as of this past December, Kent Ochel's operation was the most profitable operation in Intel. It was a tremendous turnaround."

Crane said that Ochel is leaving the company a very profitable and healthy division. He expressed confidence that Intel will be able to find a suitable replacement, but indicated there was no rush to find a successor.

REACH FOR THE TOP.



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Speakers and Schedule for Basic Sessions on April 23

The Basic Sessions deal with everything from the need for word processing to cost justification through getting underway, implementing, office communications and management and control for day-to-day operation.

Walshe

Basic Sessions on the first day will be chaired by Willoughby Ann Walshe, executive editor, *Word Processing Information Systems* magazine and *Information & Word Processing Report* newsletter, published by Geyer McAllister, N.Y.C.

Additional speakers include:

Feidelman

Lawrence Feidelman
President
Management Information Corporation

Sylva

Steven Sylva
Manager, Interactive Service
Division of Management Information Services
Commercial Union Insurance

Sylvia Courtney
Office Automation Manager
Commercial Union Insurance

9:00-10:00
First Steps in Word Processing

A discussion of the productivity problems in organizations using standard office equipment and how to improve personnel efficiency with new technology. You will get an emphasis on the latest trends, strategies, and problems in planning automated offices.

10:15-11:15
Surveying Word Processing Equipment

A survey of the latest in basic word processing equipment and software packages and the definitions, capabilities and limitations of each. You will learn how to evaluate and adapt such equipment to your needs.

11:30-12:30
Vendor Session

Special demonstration session with one of four leading vendors of the latest WP/DP equipment. You may ask questions, get solutions to problems and try out equipment.

12:30-1:30
Luncheon

1:45-2:45
Getting Word Processing Underway

You will get help on every aspect of getting word processing systems in place from identifying bottlenecks in your office to evaluating vendors. You'll learn the strengths and weaknesses of word processing equipment, how to get management commitment and how to work with consultants.

3:00-4:00
Vendor Session

4:15-5:15
Cost-Justifying Word Processing

You'll learn the basics of selling management on word processing from determining the benefits and measuring productivity improvements to defining real and hidden costs and predicting future applications. You'll get expert advice on developing a presentation.

5:15-6:30
Informal Networking

Enjoy a glass of wine and mingle with your colleagues, session leaders and vendors.

Speakers and Schedule for Basic Sessions on April 24

Eisen

The second day chair of the Basic Sessions is Jerrold B. Eisen, president of Offices Sciences International, Inc., a subsidiary of Communications Sciences Inc.

Additional speakers include:

Maskovsky

Gerald Maskovsky
Director
The Office of the Future
Coopers & Lybrand

Lovit

Herb Lovit
Chairman of the Board
Communications Sciences, Inc.

Reino

Patricia Reino
Manager, Administrative Support Services
Olin Corporation

9:00-10:00
Vendor Session

10:15-11:15
Implementing the Plan

You'll begin with a definition of strategic planning and proceed with assessing the human aspects of planning—personnel considerations, staff selection and training programs. You'll learn through the use of case studies demonstrating the relationship of planning to successful implementation.

11:30-12:30
Vendor Session

12:30-1:30
Luncheon

1:45-2:45
Communications in the Office

You'll get the facts on communications transfer from terminal to terminal or terminal to computer aiding inter- and intra-office communications. You'll learn the issues, problems and solutions of mixed vendor equipment; what communications options are available; how to plan a word processing network and how communications is the first step in electronic mail.

3:00-4:00
Management and Control of Word Processing

You'll learn how to handle the crucial challenge of overseeing the day-to-day operations of the system. You'll hear how to establish work flow procedures; how to train and supervise staff; how to set standards and goals; how to measure and evaluate WP personnel and how to perform cost control and budgeting functions.

4:00-5:00
User/Vendor Wrap-Up Session

Potential users, users and vendors will get an opportunity to discuss the current needs, problems, solutions and technologies for today's office as well as in the office of the future.

office automation can hurt you.

Speakers and Schedule for Advanced Sessions on April 23

The Advanced Sessions begin with comprehensive work on office automation concepts through problems and solutions and a double session on achieving full integration. There'll be guidance sessions on applications planning, word processing, interface options and even electronic mail.

Martin

Norman M. Martin, chair of the first day Advanced Sessions, is president of his own consulting firm and has 25 years experience with word/information/data processing equipment and systems as well as digital data communications.

Additional speakers include:

Polizzaano

Peter Polizzano
Vice President, Marketing Programs
CompuScan

Eugene Starr
Director of Corporate Development
Ontel Corporation

9:00-10:00
Office Automation Concepts

You'll get a comprehensive discussion on how to assess your company's office automation requirements; how to distinguish between word, information and data processing needs; how to evaluate and set priorities; how to determine the best approach to achieve automation objectives and how to recognize the most common traps—and avoid them!

10:15-11:15
Vendor Session

Special demonstration session with one of four leading vendors of the latest WP/DP equipment. You may ask questions, get solutions to problems and try out new equipment.

11:30-12:30
Problems and Solutions

You'll be given a close look at the problems caused by the inherent incompatibility among various machines and systems, especially when more than one vendor is involved. You'll hear unique methods and approaches to avoid or overcome these difficulties including: Employing digital communications to accomplish a merger of word and data processing applications; maximizing the use of peripheral devices to achieve system integration; detailing the role of facsimile machines, OCR readers, intelligent copiers and similar equipment in automated offices; using "black boxes" and imaginative interfacing techniques to handle phototypesetting and other possible requirements.

12:30-1:30
Luncheon

1:45-2:45
Vendor Session

3:00-4:00
(15-minute break)
4:15-5:15
Achieving Full Integration

In this session you will get details on how to use communications networks to plug gaps that may still remain in the information processing system following the development of a compatible on-site system using the procedures outlined in the previous two sessions.

You will hear discussions on the telecommunications industry describing available and future networks; the relative advantages of value-added, computer-based networks; store-and-forward technology's role in office automation; implementing an in-house communications network and problems with protocol and how to solve them.

You'll get a review of the various types of computerized data bases available to those organizations which have developed the in-house systems capable of accessing these libraries; a discussion of services and a discussion on the importance of planning for the future.

5:15-6:30
Informal Networking

Enjoy a glass of wine and mingle with your colleagues, session leaders and vendors.

Speakers and Schedule for Advanced Sessions on April 24

Greenblatt

Robert Greenblatt, president of National Word Processing, Inc., a firm specializing in the design and implementation of administrative programs to integrate data processing and word processing,will chair the second day Advanced Sessions.

Additional speakers include:

Herb Fried
Systems Officer
Citibank of New York

Joseph Ramellini
Director, Advanced Office Support Systems
CBS, Inc.

Angelo Cappelo
Officer Services Manager
Pepsico Inc.

9:00-10:00
Applications Planning for WP/DP

You will be guided over the background information steps necessary to help you to develop a multitude of applications. You'll hear about the important steps in planning/selecting the analysis team; identifying initial applications; determining cost justifications and high payoff applications; expanding the team and applications. "The software issue, make or buy?" will also be examined.

10:15-11:15
Vendor Session

11:30-12:30
Word Processing Interface Options

You'll get comprehensive information on the word processing interface options available for transferring stored text, data and graphics between locations, as well as a close look at systems and devices such as printers, communications, OCR, COM phototypesetting, ADP, Micrographics and facsimile.

12:30-1:30
Luncheon

1:45-2:45
Vendor Session

3:00-4:00
Electronic Mail via WP/DP

In this session you'll get a discussion on the concepts, technologies, cost justifications, systems and applications of electronic mail with word processing and data processing.

4:00-5:00
User/Vendor Wrap-Up Session

Users and vendors will get an opportunity to discuss the needs, problems, solutions and technologies for today's office and for the office of the future.

Registration Is Fast and Easy

REGISTER TODAY: The Invitational Systems Conference on Word Processing and Data Processing produced by CW Conference Management will be held at the Rye Town Hilton, 699 Westchester Ave., Port Chester, NY 10573, just off the Cross Westchester Expressway (I-287). The conference fee is $295 per person and covers two days of sessions and two luncheons. **For more information or to register call Louise Myerow, Registration Coordinator, on our toll-free number: 1-800-225-4698, ext. 435. In Massachusetts call (617) 879-0700, ext. 435.**

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CW

IPL Files Petition To Offer Common Stock

WALTHAM, Mass. — IPL Systems, Inc. filed a petition recently with the Securities and Exchange Commission to publicly offer 1.4 million shares of common stock.

About 1 million shares of common stock will be sold by two underwriters: Smith, Barney, Harris, Upham & Co., Inc. and L.F. Rothschild, Unterberg Towbin, a spokesman said.

The other 400,000 shares will be sold by key IPL employees, a spokesman added.

Availability Date

IPL estimated over-the-counter shares will be available in late April or early May.

IPL sells an IBM-compatible line of processors similar to IBM's 4300 line.

The IPL line consists of three models: the 4436, similar to IBM's 4331; the 4443, similar to the 4341; and the 4446, a larger version of the 4443.

IPL, formerly an OEM vendor for Control Data Corp.'s Omega 480 line, was founded in 1973, a spokesman said.

It started selling end-user systems in October 1980. A spokesman said the firm has installed 11 systems.

PCM's Near-Term Success Linked to User Attitudes

(Continued from Page 93)

"The current sales environment facing the PCM vendors includes a mixed bag of differing user opinions, successful and unsuccessful PCM vendors and diverse IBM strategies," the report said.

CSI predicted the growth rate for the 4300 series will be between 50% and 75% a year over the next five years with PCMs such as IPL Systems, National Advanced Systems and Nixdorf reaping much of the benefit.

But, CSI warned, in the near future, the PCM market will require more self-reliance and demonstrable innovativeness on the part of the PCM vendor with three major driving forces shaping the industry: new vendors, new technologies and new IBM products and strategies.

"The U.S.-based PCM vendor can expect to receive increasingly greater competition from foreign vendors — from Europe, the Middle East and from the Far East. Many new American vendors can also be expected to enter the growing market. It is even possible that some traditional mainframe vendors such as NCR and Burroughs may become PCM vendors as well," the report said.

In the area of technology, new very large-scale integration (VLSI) semiconductor components, charge-coupled devices, bubble memory, fiber optics and advances in thin-film disk drive technology will have a significant effect on PCM architecture and price/performance trends. "The advent of a 370 on a chip will eventually allow the introduction of very low-cost mainframes," the report added.

Forecast for IBM

CSI said IBM can be expected to make life more complicated and competitive for PCM vendors with major new mainframe announcements such as the expected 4351, four mainframes in the large "H" series family, a new relational data base management system (DBMS), extended color graphics products and a whole series of advances in the communications processor area.

According to the report, IBM is also expected to extend product functions through hardware, software and microcode, making it increasingly difficult to replicate or replace an IBM hardware or software product. The analysis shows that 44% of the current PCM market has adopted, or is moving towards adopting, IBM's Systems Network Architecture (SNA), 23% have rejected it and 33% are still undecided.

Nevertheless, CSI estimated the PCM vendors would accumulate around $2.8 billion from system sales during the next five years with additional revenues generated by the sales or peripherals and software for PCM and IBM mainframe systems. "It is estimated that between 1980 and 1985 more than $30 billion worth of peripherals will be shipped worldwide to users of IBM-compatible (IBM/PCM) mainframes," the report added.

At the end of 1979, the PCMs had installed, according to CSI, more than 1,000 systems worldwide with the business sector accounting for about 15% of the installed base, the insurance sector, 10% and the government/education sector, around 20%.

By far the greatest market penetration was carried out by Amdahl Corp. and National Advanced Systems (NAS) division of National Semiconductor Corp., which between them scooped up more than 70% of the market. However, said the report, as new vendors such as Magnuson Computer Systems, IPL and Nixdorf became more established and aggressive, market shares would begin to shift.

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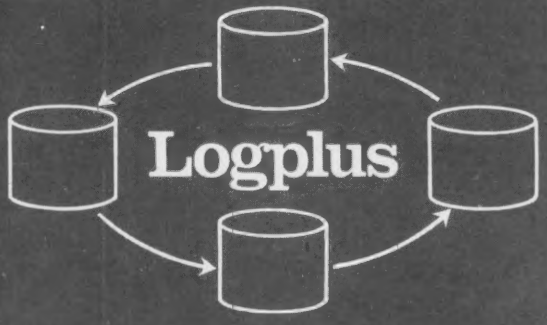

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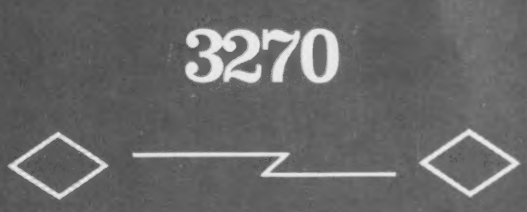

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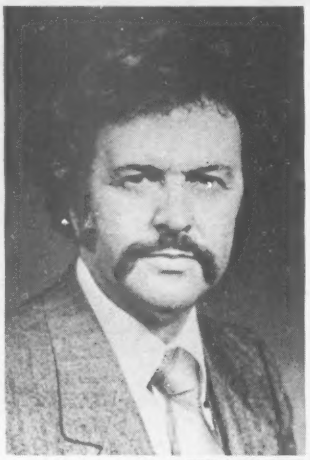
Government Contracts: The Thrill of Victory . . .

(Continued from Page 93)

ernment sales often find their profit margins there considerably higher than inprivate commerce.

Selling to the government is "a tough business," we conceded, but it is also "an intellectual business." There is "a well-defined system" of government contracting that makes it better organized and fairer than commercial sales, according to Miller.

Compared to government contracts, private-sector agreements are "laughable," he said. The secret, Miller said, is knowing how to play the game; and for those who do, the payoff is great because federal contracts can be much larger and longer than commercial contracts.



CW Photo by J. Kirchner

Terry Miller

It is a business that can make grown men cry, he said, but DP firms should keep in mind that "the vendor is always smarter than the government [negotiating] team" and thus more likely to come out on top.

'Big Time'

The key to success, he said, is "you have to outsmart the government. And that's not hard to do, by and large," he added, "because the government goes home at five o'clock." Successful vendors are those willing to work hard. After all, Miller said, "This is a big, tough game." He likened it to playing in the NFL — "the big time."

And as in professional sports, congeniality doesn't win any points toward contract awards, according to Miller. Getting the sale depends on being intelligent, hard-working, better informed and at times just a little irrascible.

"You don't have to be nice to the government," he said, as you do to commercial sales prospects, who can walk away if they get angry. Because federal negotiators don't always play by the rules, vendors don't always have to be so reasonable, he said, adding that once and a while, "you have to poke them in the eye" and force them to live by their own regulations.

Miller refers to this "hit them over the head to get their attention" tactic as "power selling," and to listen to him, it's what separates the men from the boys on both sides of the bargaining table.

"There's a lot of dumb men in the business," he explained, adding this is true "especially in your home office . . . so keep them out of the process." This specifically aplies to corporate attorneys, who can be "your own worst enemies," according to Miller, unless they have the necessary zest for the business.

Common Problems

He emphasized the last point when listing common problems and mistakes made by sales representatives when dealing with the government.

Bad legal advice is often the downfall of a company's negotiators, he said. They need an attorney who really understands the applicable laws, regulations and processes of selling to federal agencies.

Another common problem is lack of "home office understanding." The home office must be educated to the needs of the Washington sales office, must trust the Washington representatives and back them with a full time, total commitment. You can't win federal contracts from your California headquarters, he observed.

Fear of the incumbent vendor is another bugaboo Miller sought to dispel. Although incumbency is a powerful ally, it is the company with the most information and best sales team that will win, he said.

He also cautioned firms to not be put off by the reams of federal contracting regulations because, he said, they actually define a well-ordered, understandable process that allows any firm, big or small, to get government sales. Without the regulations, he said, "there would be 9,000 IBM 4331s and 168s in every closet."

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. . . And the Agony of Defeat

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — It can make grown men cry, stout men tremble and send your company to a fiery death of blazing bad press, and if not for the money, who would bother anyway? But so long as selling to the government is profitable, companies will put up with the aggravation, according to a Washington attorney who urged his corporate clients to operate cautiously.

"While paranoia is unnecessary, we all have to be more careful when dealing with the government," attorney David S. Cohen told a recent gathering of the Computer Law Association here (see story beginning on Page 93).

Government contracts are not just an agreement to supply goods or services at a given price. Federal contractors "have signed on to a way of life," according to Cohen, who noted government contracts frequently are regulatory devices.

The vendor can routinely expect to find that in his contract he is also promoting clean air, aiding suppressed minorities, bolstering salary levels of disadvantaged youths and helping control or decontrol — depending, it often seems, on what day of the week it is — any number or types of industries.

Where there is profit there is also pain and anxiety, Cohen said, pointing in particular to the dreaded "price-reduction clause" common to federal contracts. By this mechanism, the federal government demands suppliers offer the government price discounts in the same amount and fashion as are offered to the contractor's commercial customers.

The clause has the potential for inflicting "devastating damage on your company," Cohen warned. He noted that disputed interpretations of the clause recently led to two companies, Tektronix, Inc. and Digital Equipment Corp., being charged in an open Senate hearing with defrauding the government of millions of dollars [CW, Oct. 20].

The publicity attending the charges must have been distressing to those firms, Cohen suggested, and said that such disputes can, in frighteningly short order, turn into fraud cases.

For that reason, he said, many companies are unwilling to fight federal agencies. If you do not like an agency's interpretation of your contractual responsibilities, General Services Administration auditors may descend on your offices and audit all your federal contracts over any number of years. This can increase your liability in terms of past revenues and future contracts lost, he said.

Popular Target

Also, government contractors are a popular target for waste and fraud reduction, according to Cohen, who said he shudders whenever he hears that crusading congressmen are out to cut "wasteful" federal spending. The supposed "fat-cat" contractors are much easier to blame for excessive government expenditures than another Congressman's favorite social program, he noted.

All of this makes attorneys for federal contractors more than a little cautious in their advice, he said, but added there seems no way around the problem.

He urged his colleagues to show forebearance and understanding. After all, Cohen pointed out, salesmen, not attorneys, negotiate contracts even though they may not know how to draw the line between good salesmanship and criminal misrepresentation.

Supershorts

Microdata Corp. has strengthened its domestic organization by combining its engineering functions into one department. Effective immediately, the peripheral systems and other engineering groups will function as one engineering department.

— — —

Durango Systems, Inc. expanded its Colt retail and OEM marketing organization by appointing Anthem Systems Co. of Burlingame, Calif., and Pro West Computer Corp. of Redondo Beach, Calif., as authorized retail/OEM distributors.

— — —

Innovative Computer Products has appointed Naco Corp. as its exclusive representative in Japan.

New Companies

Brillig Systems, Inc. has been formed to offer software consulting services to IBM mainframe users. The company is located at 10270 Fern Pool Court, Burke, Va. 22015.

Cole International Consultants, Inc. is a new data processing consulting firm. The company was founded by Kenneth Cole, a former administrator with the accounting firm of Seidman & Seidman. The new company is located at The Prado North, Suite 300, 5600 Roswell Road, N.E., Atlanta, Ga. 30342.

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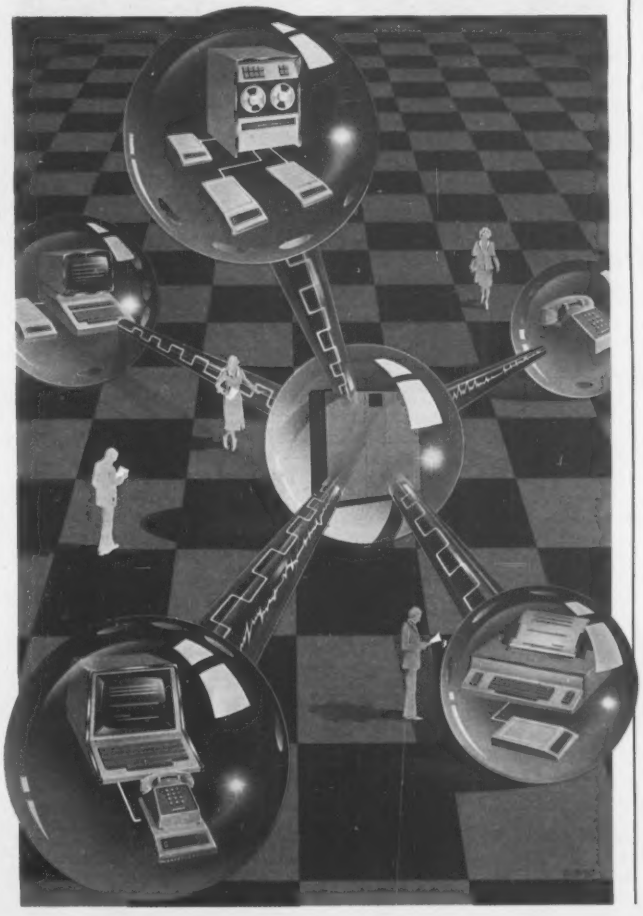

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Contracts

Rockwell International Corp. has been awarded a contract by IBM for delivery and integration of Collins telecommunications equipment that will be used by IBM in its private communications network.

Arrow Computer Systems, Ltd., Surrey, England, has signed a $400,000 contract with Kennedy Co. for Model 5305 Winchester disk drives and Model 6450 backup cartridge transports. The drives will be used in Arrow's small business systems based on Digital Equipment Corp. LSI-11 micros and PDP-11 minis.

Linkabit Corp., an operating company of M/A-COM, Inc., has received a contract in excess of $20 million from Satellite Business Systems to design, develop and produce digital signal processing equipment to be used in the SBS satellite business communications system.

Beehive International has signed an agreement with Quotron Systems, Inc. to provide terminals through February 1983. The value of the contract is more than $3.2 million.

Rath & Strong Systems Products, Inc. of Dallas has signed an agreement with Cullinane Database Systems, Inc. that permits Cullinane to use Rath & Strong's Productivity and Inventory Optimization Systems (PIOS) manufacturing software system with Cullinane data base products. Under the terms of the agreement, Cullinane will pay Rath & Strong more than $1 million for the use of the PIOS system.

Decimus Corp. of San Francisco has signed a contract with Bunker Ramo Information Systems Division to provide host computer processing services through 1985 to banks that install Bunker Ramo's Bank Control System 90 on-line teller terminal systems.

The Kennedy Co. of Monrovia, Calif., has received a $3 million Winchester drive contract from Pertec Computer Corp. Systems Group. The drives will be used in Pertec's XL40 turnkey small business systems.

Anacomp, Inc. and NCR Corp. have signed a multimillion-dollar software contract to develop and implement an interactive comprehensive hospital information system over the next three years for a large midwest hospital.

System Development Corp. has been awarded a multiyear contract for Basic Grant Application Processing by the U.S. Department of Education. The contract, valued at $26.8 million, includes processing applications for Basic Education Opportunity Grants for three school years.

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Orders & Installations

Safeway Stores, Inc. has ordered advanced portable data entry terminals at a price of up to $3 million from MSI Data Corp. The MSI/88e terminals will be used by the food chain for electronic order entry in its domestic stores.

Pentamation Enterprises, Inc. has received an acquisition from Automatic Data Processing, Inc., which will add 50 nursing homes to its list of customers utilizing its data processing services.

Logisticon, Inc. will provide a turnkey computer system to control material handling at Waterway Terminals Co.'s one million sq ft distribution center in Portland, Ore.

Foreign Orders & Installations

The Secretaria de Telecommunicaciones y Transportes (SCT) of Mexico has installed a GTE Telenet Communications Corp. five-city public data network. Based on advanced packet-switching technology, the SCT network incorporates microprocessor-based switches and concentrators originally developed by Telenet for its own network in the U.S.

TRW Controls Corp. of Houston has been selected by Petroleos Mexicanos to supply two supervisory control and data acquisition systems for the monitoring and controlling of gas pipelines in Mexico. The systems will utilize dual Data General Corp. Eclipse computers, programmed by TRW, to provide pipeline monitoring and control functions. Value of the two contracts exceed $5 million.

The Societe Internationale de Telecommunications Aeronautiques, an international cooperative, nonprofit organization owned by member airlines, has ordered a Univac 1100/83 computer system valued at approximately $5 million for use in its Gabriel Services Division.

Focus on Users' Software Needs

Vendors Told to Avoid Imitation

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Software vendors spend far too much of their time imitating other firms' successful products when they should be concentrating instead on addressing unmet user needs, according to Compiler Systems, Inc. President Gordon Eubanks.

Speaking at a recent OEM conference here, Eubanks urged systems integrators and resellers to encourage their suppliers to avoid excessive product imitation, which he criticized as a "waste of valuable programming talent."

Eubanks, whose Sierra Madre, Calif.-based firm invented the C-Basic applications development language, advised vendors to identify software products that have already proven their worth on large-scale systems and then adapt those programs to run on minicomputers and microcomputers.

He cited the example of Personal Software, Inc.'s Visicalc applications package, which was originally developed for large mainframes and later transferred to microcomputers like Apple Computer, Inc.'s Model II.

Top Priority

Selection of the right software supplier ranks as one of an OEM's most important business decisions, Eubanks told his listeners. In evaluating possible software vendors, an OEM should give top priority to firms that specialize in selected vertical market segments.

OEMs can ill afford to attack narrowly defined vertical marketplaces with general-purpose application packages. On the contrary, OEMs have to tailor their application software to meet the differing needs of each of their target users, Eubanks said.

Application programs play an even greater role in satisfying a minicomputer or microcomputer user's needs than either operating systems or programming languages, the speaker added during an OEM Forum panel session dealing with industry obstacles and solutions.

Another of the conference's speakers, Vector Graphic, Inc.'s marketing vice-president Carole Ely, echoed Eubanks' sentiments about the importance of application software in penetrating the low-end systems market.

"Solutions are what count in the very small systems sector, and solutions mean software," Ely said during a panel discussion exploring major OEM market opportunities.

Ely urged OEMs to adopt the "supermarket approach" in their efforts to gain a foothold in the low-end systems field. The supermarket approach, in which completed systems are assembled with modules drawn from multiple suppliers, should be based on a "solid relationship" with a hardware vendor whose products are upgradable and conform to accepted industry standards.

At present, she added, more than 80% of the U.S.' 2.2 million small businesses are still doing their basic administrative and information processing tasks manually. But the trend among these companies, whose annual revenues typically fall in the $100,000 to $1 million range, is clearly toward greater and greater automation.

Most of the U.S. small businesses now entering the computing age are first-time users with no professional systems personnel, and they require turnkey products that provide solutions to nuts-and-bolts business problems, Ely said.

Mergers & Acquisitions

Electrosound Group, Inc. has acquired **Telcom Corp.** Electrosound Systems, Inc., a newly formed subsidiary, will conduct the business as successor to Telcom, a two-year old Phoenix-based manufacturer and supplier of data communications equipment and systems.

GCA Corp. will acquire **Par Systems Corp.** in an exchange of stock. The agreement calls for the holder of each share of Par's common stock to receive .486 of a GCA share. Based on GCA's closing price of $49.50 on Feb. 17, the transaction would have a value of approximately $26,000,000.

Asid Formed

WASHINGTON, D.C. — A nonprofit association has been formed to encourage the proliferation and use of high-technology-based information systems in industry and in homes.

The Association of Information Systems Distributors (Asid) will include committees designed to focus on problems peculiar to particular information areas, it said. Membership is extended to any organization involved in marketing or distribution and sale of information systems.

Dues for the first-year membership are $100. The association is based at Suite 200, 1735 K St., N.W., Washington, D.C. 20006.

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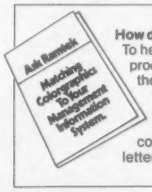

How do colorgraphics fit into your MIS picture? To help you evaluate the business graphics products on the market, Ramtek has prepared the booklet, "Matching colorgraphics to your Management Information System." It's Issue Number 5 of Ramtek's Use Our Experience Series. To get your free copy, write to Ramtek on your company's letterhead.

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As Commercial Use of Micros Expands

Cbema Calls for Revised Export Control Process

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Growing microelectronics use in consumer products threatens to overwhelm administration of U.S. export control regulations designed to restrict spread of strategic technologies, a DP industry group warned recently.

The export control process will be "inadequate in the future, due to the accelerated rate of change in technological content in commercial products," the Computer and Business Equipment Manufacturers Association (Cbema) said in a white paper on trade and national security now circulating in official circles here.

The objective of the paper, Cbema said, "is a joint industry/government effort to achieve more consistent, more rational controls that will encourage development of a strong industrial base while fully supporting the need to maintain national security."

The paper said implementation of the Export Administration Act of 1979 is not fulfilling the purpose of the law: to protect national security while fostering exports to stengthen the U.S. economy and to minimize uncertainties in export control policy.

Problems of Administration

While agreeing wholeheartedly with the aims of the law, Cbema said "the manner in which the act has been administered has created serious problems for export of products with a high-technology content and discourages would-be exporters."

Basically, the paper said, the controls have been overrun by changes in the American economy and those of its allies and potential adversaries.

"The U.S. no longer enjoys a clear technological advantage over other nations in many areas," Cbema noted. "In computers and microelectronics . . . competition has increased enormously. The equivalent technology is available from Japan, Germany, France and England and is being marketed aggressively in Eastern and Western countries.

"Perhaps even more revolutionary," the paper continued, "is the increasing pervasiveness of microelectronics. Toys, educational aids, consumer electronics, industrial controls, automobiles and endless other products are benefiting from the introduction of special-purpose and 'standard' microcomputers and microcircuits."

Control and Security

Efforts to control exports of these products in the name of national security could overwhelm the export control process, Cbema said.

"Ill-conceived efforts to control this explosion of microcircuit development and utilization in civilian products could stifle American industry to the benefit of foreign competition without protecting our national security.

"An ineffective control system, despite proper intention, can defeat its own purpose by simultaneously impeding the growth of our export industries while diluting our emphasis on strategic items," Cbema said.

The association also cautioned export controls could "drive a wedge between military and commercial product bases," depriving the U.S. military of the "energy and vitality incorporated in the commercial sector of the U.S., slowing down the rate of advance of military products and raising the costs of military electronics."

In other words, the paper said, "national security is not only the issue of military content of commercial trade, but it is also the economic vitality and competitiveness of U.S. industry."

Five-Point Proposal

Warning that "unless an overall policy is developed and carefully administered, our export controls will be outpaced by events," Cbema offered a five-point proposal for "a workable policy":

• Establish policy, then controls. "Allowing ad hoc case-by-case decisions to dictate policy is a nonpolicy. Policy must be established first, based on criteria clearly in the national interest, then controls must be established to implement that policy."

• Establish better relations with allies. Cbema decried the "disparity of controls that exists between us and our allies." This can be overcome, the paper insisted, "by precise definitions of national security backed up by clear statements of why these are in the mutual interest of the allies."

• Eliminate unilateral controls. "In addition to the expanded Commodity Control List imposed by the U.S. government there exists a de facto differential between the U.S. and our Cocom allies in the implementation of current administrative procedures, which penalizes U.S. companies.

"The imposition of unilateral controls and procedures provides opportunities for competitors at the cost of U.S. jobs, reduces the capability of U.S. industry to compete in world markets and further diminishes the U.S. presence in these countries."

• Control only militarily significant technology. While supporting the need to control "truly militarily significant" products and know-how, Cbema said it is "dissatisfied . . . with the government's ability to separate the significant military content from dual-use items common in commercial trade."

• Simplify and expedite licensing. "Growth in export earnings will come from encouraging new firms to participate in developing world markets, as well as from enhanced performance from those companies already in the marketplace," Cbema said.

"But to stimulate such growth, one of the greatest disincentives must be removed: the burden of administrative procedures now required to comply with export regulations as presently administered.

"This burden falls heaviest," the paper said, "upon the small- and medium-size companies who do not have the resources needed to cope with these financially exhaustive administrative procedures. These reforms must come now, when microcircuits and microcomputers are becoming the stimulus to literally thousands of new businesses."

Executive Corner

• Wayne E. Sennett has joined Zilog, Inc. as vice-president of strategic planning.

• Robert Downs has been named vice-president of research and development at Solvation, Inc.

• Richard A. Fivek has been appointed vice-president of marketing at DTSS, Inc. and J. Peter Manzo Jr. has been promoted to vice-president of software development at that firm.

• David L. Lea has been promoted to vice-president of marketing for the Terminal Products Division of Telex Computer Products, Inc.

• Gerald F. Atterbury has been named vice-president of engineering at System Industries, Inc.

• John Muhlner has been appointed vice-president of finance at BDS Corp.

• John Humphreys has been named corporate vice-president and general manager of the Systems Division of National Semiconductor Corp.

• Edward N. Friedman has been named assistant vice-president and director of system development and maintenance at System Analysis Corp.

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For information call Burroughs local office or toll free in the continental U.S. 800-521-4866. In Michigan, 800-482-2402. Or write to Burroughs Corporation, Dept. CW-8, Burroughs Place, Detroit, MI 48232.

Burroughs

Expansions

Mikros Systems Corp. has opened new headquarters in Mercerville, N.J. The new facility is located at 3828 Quaker Bridge Road, Mercerville, N.J. 08619.

Stratus Computer, Inc. has leased a second building located next door to its present offices in Natick, Mass., for use as a marketing and manufacturing facility. The additional 8,000-sq-ft of space is targeted to be occupied by mid-1981.

Diablo Systems, Inc. has broken ground for its new 465,000-sq-ft manufacturing, engineering and administrative facility. The plant site is located in the Sutter Hill Fremont Industrial Tract, adjacent to Highway 17 and Interstate 680, Fremont, Calif.

BDS Corp. has established a sales office for its line of plug-compatible line printers in Canoga Park, Calif. The new address is P.O. Box 1024, Canoga Park, Calif. 91304.

Spectra Medical Systems has opened a new regional sales and service office at 90 Mayfield Ave., Edison, N.J.

Digital Datacom, Inc. has moved to a new 10,000-sq-ft facility located at 27721 La Pax Road, Laguna Niguel, Calif. 92667.

Megatek Corp. has formally opened its first Southern region offices in Atlanta and Dallas. The company also has moved its Eastern region sales office to new facilities in the Boston area. The new Georgia offices are located at Suite 107, 6025 The Corners Parkway, Norcross, Ga. 30092. The new Dallas facilities are located at Suite 500, Regency Center/II, 5501 LBJ Freeway, Dallas, Texas 75240. The Eastern region office has been moved to 888 Washington St., Dedham, Mass. 30092.

Televideo Systems, Inc. has major expansion plans that include moving to a new 110,000-sq-ft corporate headquarters site and establishing four new district sales offices. The company has occupied two new buildings at 1170 Morse Ave., Sunnyvale, Calif. 94086. Televideo has also opened new district sales offices in Atlanta, Chicago, Sunnyvale and London.

The **Business Forms Group** of **SCM Corp.'s Allied Paper Division** plans to build a business forms plant at Bellville, Texas.

DP Professionals has opened branch offices in Irvine and Sherman Oaks, Calif. The address of the Irvine office is 2091 Business Center Drive; the address for the Sherman Oaks office is 14011 Ventura Blvd.

Harris Corp. has begun construction of an $8.2 million, 215,000-sq-ft office and manufacturing facility in Melbourne, Fla., for its rapidly growing Controls Division.

Simplan Systems, Inc. (SSI) has opened a Milwaukee office to handle the sale and support of its products and services in the Midwest. SSI's new office is located at Suite 508, 622 N. Water St., Milwaukee, Wis. 53202.

Dypy S.A., a joint venture between France's Rhone-Poulenc and the Dysan Corp. of Santa Clara, Calif., will construct a facility at Albi, France, to manufacture flexible memory disks for the information processing market. The plant, which will cost about $9 million, will complement an existing Dypy unit in Nangis, France, producing rigid memory disks.

Infodata Systems, Inc. has opened a new central regional office in St. Louis, Mo., to market the Inquire data base and IQ/NET distributed data systems to a 10-state region.

Xerox Corp. plans to begin construction this month of a manufacturing and warehouse facility in Fremont, Calif., for its subsidiary, Diablo Systems, Inc. The multipurpose building will be located on a 28-acre site in the Sutter Hill Fremont Industrial tract adjacent to Highway 17.

Computer Task Group, Inc. has announced the opening of its Washington, D.C., office at Suite 200, 2000 L Street, N.W., Washington, D.C. 20036.

Nixdorf Computer Corp. will establish Midwest Regional Headquarters in a new 11-story office building in the O'Hare Towers complex now under construction adjacent to Chicago's Kennedy expressway.

Informatics, Inc. has opened new offices at Suite 2716, One Embarcadero Center, San Francisco, Calif. 94111. The new office will house the professional services and software products organizations.

Microcomp, Civil Engineering Software Systems, has relocated their offices from Solana Beach, Calif., to Suite 211, 125 E. Ball Road, Anaheim, Calif. 92085.

Systematics, Inc. has unveiled a 20-year, $35 million design and construction plan for a new corporate headquarters at Little Rock, Ark.

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TO Diana La Muraglia
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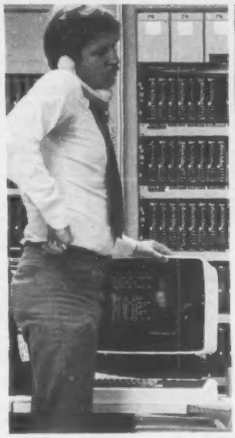

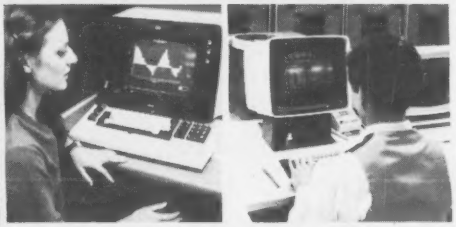

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(612) 339-9001

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Experience in mfg financial systems and knowledge of COBOL programming with the ability to communicate effectively with financial management required to install systems packages for diversified mfg. Opportunity for travel and exceptional visibility.
Mid-twenties

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Degree preferred, not required. 2+ yrs exp RPG II, Databus, Datashare, COBOL. Good growth/earnings potential plus exposure upward to management. $15-24,000

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Due to expansion, company offers unusual chance for the experienced programmer analyst to expand technical horizons. Qualified candidates must have 8 yrs DP exposure with RPG II, COBOL on-line and user-client experience. Position will develop new financial sys. Salary to $28,000

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Degree preferred, large company needs candidate to oversee its Computer Operations Division. Qualified Candidates must have 5 yrs plus management exp in IBM/370/3033/4331, DOS, OS environment. People motivation is the key to this job. Unlimited opportunity.
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Rapidly growing fin'l inst seeks dynamic sys leader to manage programming staff in lge sys environ. Proven ability to develop maj projs ontime within budget, according to specs. Salary $30,000 range

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Prominent Seacoast mfr involved in maj apps design & implem. Strong mfg sys analyst bkgrd req. Prior prog exp desirable. Data Base sys exposure a +. IBM 4341 environ.
Salary $27,000

CICS PROGRAMMER

Maj ins co seeks sr prog analyst with CICS skills. Min 3 yrs exp COBOL or PL/1. TOTAL & MARK IV knowl a +.
Salary $26,000 range

SR PROGRAMMER ANALYST

Very profitable consumer products div of Fortune 500 co seeks sr mfg sys programmer. Extensive on-line development projs. CICS bkgrd a +. Strong COBOL skills req. Fin'l apps knowl helpful.
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SYSTEMS ANALYST

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Salary $23,000

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Salary $26,000

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- Software Tools Development and Support
- Transaction Processing Systems Development

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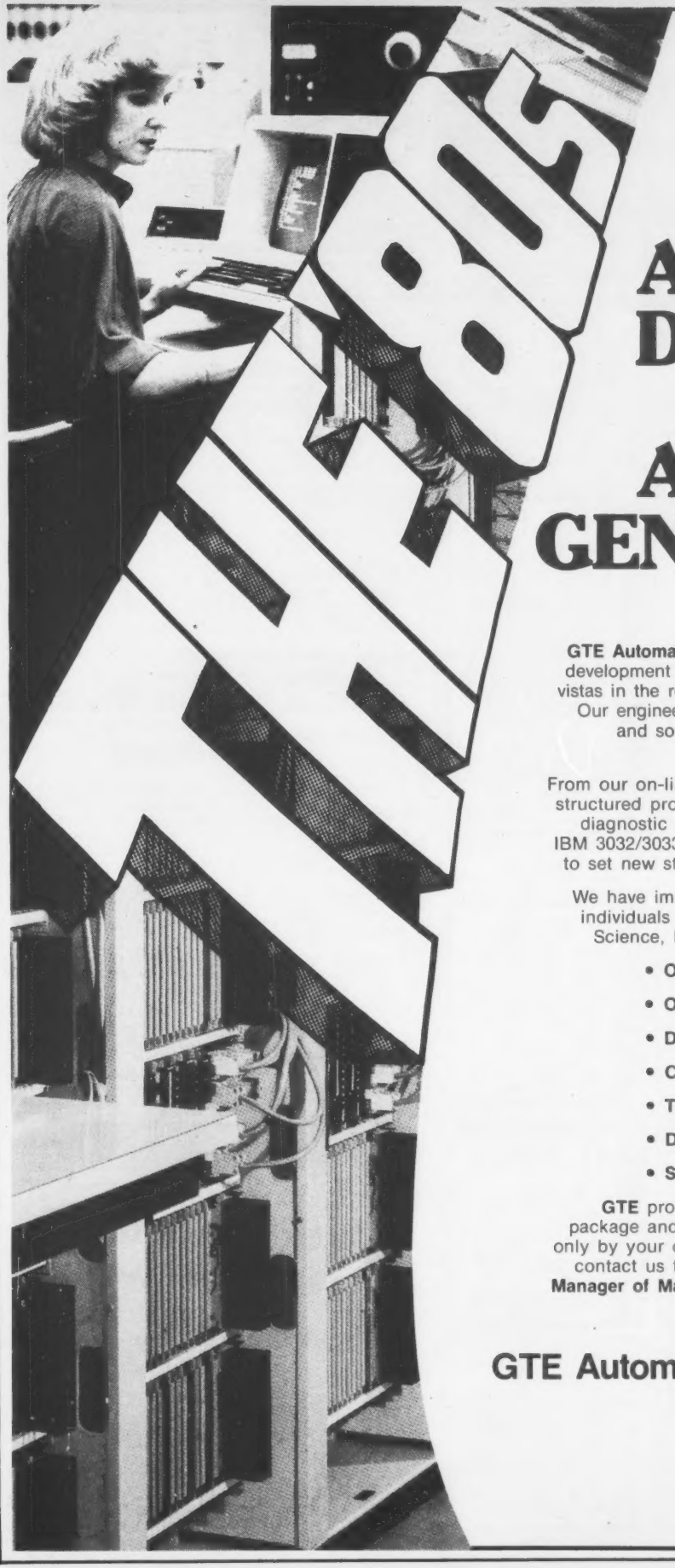

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Qualifications: A graduate degree in the business field is required. Work experience in the data processing area is required. **Duties:** teach 12 semester hours at the undergraduate level. Courses may be offered both day and evenings. **Subjects to be taught may include:** Introduction to Data Processing, COBOL, FORTRAN, BASIC, Systems and Procedures, and advanced data processing courses. Other professional duties such as serving on committees, advising students, and holding office hours will be expected. **Salary:** Commensurate with experience. This position will be for September, 1981. The last day to apply will be April 22, 1981. **Please submit to:** Dr. Helen Prather, Chairman Department of Business Services - University of Houston Downtown College - One Main Street — Houston, TX 77002.

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.

Computer Science

Millersville State College (PA)

Millersville's rapidly expanding Computer Science Program has openings for **three** individuals to teach undergraduate computer science courses. **Two tenure track** positions and one temporary position will be filled this fall to meet our anticipated student enrollment. The Math and Computer Science department offers Bachelor's degrees in Computer Science, Applied Math, Liberal Arts Math and Math Education. We require a strong commitment to teaching excellence and a keen interest in recent developments and trends in the field.

If you possess at least a Master's degree in computer science with solid teaching and/or business (industrial) experience, please send us your application today.

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Reply by April 15, 1981 by sending transcripts, and three letters of reference to:

Mr. Robert S. Shask, Chairperson
Department of Math and Computer Science
Millersville State College
Millersville, PA 17551

Millersville State College earnestly seeks and is eager to receive applications from minority and women candidates.

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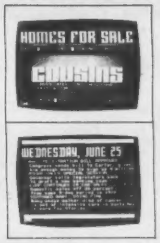
South Florida.



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We're looking for highly qualified individuals to help unlock the technological door to the next big future industry. . . Home Information Systems.

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- Procedural and non-procedural data base language interface specification and implementation
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Our company is currently running a trial of the world's most advanced home information system. TV sets, with added electronics built by the Bell System, were supplied to families in Coral Gables, Florida who are accessing our 20,000 frame database over the telephone network. This information database consists of constantly updated news, weather, sports, reference material, local information and merchandise catalogs. Services provided include electronic information retrieval, merchandise ordering, banking and funds transfer, electronic mail and a whole lot more.

Using this experience we are designing our next generation system with vastly increased thruput and enhanced features.

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We offer highly competitive salaries and exceptional company benefits. We have a work environment that offers career growth in a rapidly expanding new area. You owe it to yourself to contact us. We need to expand our team and if you would like to be considered, please phone (collect) (305) 350-6078 or send resume, attention:

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1444 Biscayne Boulevard
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Miami, Florida 33132

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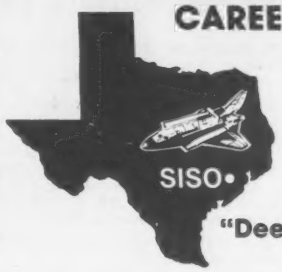

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JIM DODD
SRZ Software Services
61 North Maple Avenue
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(201) 444-9800

STEVE COMEAU
SRZ Software Services
The Jenney Building
Route 101A
Amherst, N.H. 03031
(603) 882-6234

TONY LAMIA
SRZ Software Services
50 West Hillcrest Drive
Thousand Oaks, CA 91360
(805) 497-6975

JACK HEMPSTEAD
SRZ Software Services
3329 Crossbend Road
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(214) 867-0030

NOTE: Additional considerations made to those who are capable of extended or frequent travel.

Experience in other nonprocedural type languages such as RAMIS II and FOCUS would also be of interest in our NY/NJ operation.

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Develop business and scientific application programs in COBOL and/or FORTRAN through interactive program development on HP-3000 Series 3 computer.

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Excellent starting salary and benefit program. Paid vacation and holidays. Send a resume of education, experience and salary requirements to:

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We are an affirmative action employer.

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Due to continued growth and expansion, this exciting career opportunity is now available at the Mobil Chemical Company's Plastics Division . . .

SENIOR SYSTEMS PROGRAMMER

You will be a key member of the team responsible for the installation, maintenance, tuning and performance management of state-of-the-art systems software. Our technical environment consists of a large 4341 OS/VS1 Processor with plans for migration to MVS, CICS, ACF/VTAM, ACF/NCP, VSAM and Data Dictionary. The successful candidate should have a BA/BS and 5 years of Systems Programming experience in a medium to large DP shop. This must include significant experience in 2 or more of the following technical areas: OS/VS1, CICS, CICS/DMS, VTAM, VSAM. Some knowledge of IMS/DB/DC or MVS desirable. Experience or knowledge of capacity planning or performance management a plus.

The Plastics Division is the country's leading supplier of plastics packaging materials oriented to the consumer, distributor, and wholesale grocery trade.

We offer competitive salaries, a comprehensive benefit program and an attractive relocation package.

Qualified individuals should send resumes with salary history and requirements to:

Mobil

MOBIL CHEMICAL COMPANY
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Route 31 Macedon, New York 14502
Attn: Jill L. Jacobson
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We are a rapidly growing transportation system with 35 locations in 15 states. we have followed a continuous policy of growth and expansion which requires the addition of a Senior Project Leader to develop transporation management informaiton systems, evaluate user needs, define projects and lead implementation.

Qualified candidate will have a minimum of 5 years data processing experience and a strong background in COBOL and on-line systems applications. Good written and verbal communications as well as the ability to interface with all levels of management are a must. A college degree, transportation knowledge and Univac 90-30/40 experience are desirable. Also helpful is a background in data communications/network and a knowledge of operating systems software.

Be part of a company that recognizes the importance and impact of data processing as an integral part of its dynamic growth. If you are a hands-on individual looking for room to move in an exciting environment, send your resume in strictest confidence to:

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Openings exist for well qualified people with a minimum or 1-2 years experience in the following areas:

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Programmers/Designers/Analysts develop, test and support major systems software products. Requirements include:

- IBM 370 Assembler
- Data Base/Telecommunications exposure
- IBM operating systems and environments.

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Our Education division seeks instructors to meet increasing demands for internal and on-site education programs. Requirements:

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- Teaching ability
- 40-50% travel

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Professional Services, our consulting arm for onsite application programming and design seeks these requirements:

- COBOL, PL1 or Assembler languages
- CICS or Data Base Experience
- Extensive travel

MINICOMPUTER PRODUCTS

- DEC, Data General, Honeywell, VAX or related exposure.

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Systems Programming positions are available which require Assembler, DOS or OS, CICS or Data Base.

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CINCOM SYSTEMS, INC.
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Four Campuses

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Bachelor's Degree, 2 years experience including medium size IBM computer, DOS/VS, CICS/VS, VOLLIE desired. Salary to $23,500.

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Salary and benefits are as excellent as the opportunities you'll find with us. For immediate consideration, please call or send your resume in confidence to:

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COMPUTERWORLD

DATA PROCESSING PROFESSIONALS

Lone Star Gas Company has an immediate need for qualified individuals in SYSTEMS SOFTWARE and APPLICATION SOFTWARE DEVELOPMENT due to growth in the area of data processing at its Dallas, Texas headquarters. We are providing state-of-the-art computer support for business, engineering and special purpose applications. Our installation consists of an IBM 3033 Model N under MVS 3.8, JES 2, CICS/VS and TSO with SPF via a network under TCAM and ACF/VTAM. Consider the following opportunities:

MVS Senior Systems Programmer

Requires three years software experience to be responsbiel for generating, maintaining, and tuning operating system. To lead implementation to MVS SP1.

CICS Systems Programmer

Requires two years experience with CICS intervals to provide installation, maintenance, and performance tuning of CICS/VS 1.4. To be responsible for implementation of CICS/VS 1.5.

APPLICATION DEVELOPMENT PROFESSIONALS

We have several openings for experienced Systems Analysts and Programmers. These positions require two to five years progressive experience in the development of applications software using PL/1 or COBOL. A working knowledge of CICS, DMS, or Mark IV is highly desirable.

Lone Star Gas Company offers excellent salaries and an outstanding benefits package. If you would like to grow with us, please send detailed resume including present salary to:

LONE STAR GAS COMPANY
Employment Section
301 South Harwood Street
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Personnel Department,
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Our environment is an IBM 370-148 VM/DOS/VS converting to a 4341 in May. The data processing department is a COBOL/ASSEMBLER shop that uses-CMS as an on-line programming tool.

WE NEED

A Systems Programmer with 2-4 years systems programming experience in CICS/VS, DMS/CICS/VS. DOS/VS, VM experience desirable.

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The Area II Educational Computer Center is taking applications through April 20, 1981 for the position of Director of Computer Center. Responsibilities include management of the center and teaching computer science courses at the North Iowa Area Community College. Minimum requirements: Bachelors Degree with a preference for a master's degree, experience with DEC computers, RSTS/E, teaching experience, written and oral communicaiton skills, computer center management experience. Salary competitive. Send letter of application and resume to:

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Athens, Georgia

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Both positions require a bachelor degree in business, engineering or computer science (or equivalent experience) and 3 or more years experience in Data Processing in DB/DC environment.

Operating environment includes: IBM4341, VS1, TOTAL DBMS, CICS/VS (BMS, Command Level), VM/CMS, COBOL, DYL260. Prior experience with Manufacturing Systems, and the above operating software is highly desirable.

Please send resume in confidence to:
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Westinghouse Electric Corporation
Newton Bridge Road
Athens, GA 30613

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HAWAII

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IBM SYSTEM/3031 MVS
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Will develop and maintain systems from lead programmer capacity and will use COBOL and IDEA. Requires BSCS degree or equivalent with 3 years experience, preferably in manufacturing.

PROGRAMMER/ANALYST

Will develop and maintain computer programs in COBOL and IDEA and perform some systems analysis. Requires BSCS degree or equivalent with 2 years experience.

Qualified candidates should call or send resume to:

J. Barlow Hergett
(919)553-5076

DataGeneral

Exeter Associates

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For prompt and confidential consideration, forward your resume to DAVID PEPIN or call him TOLL FREE.
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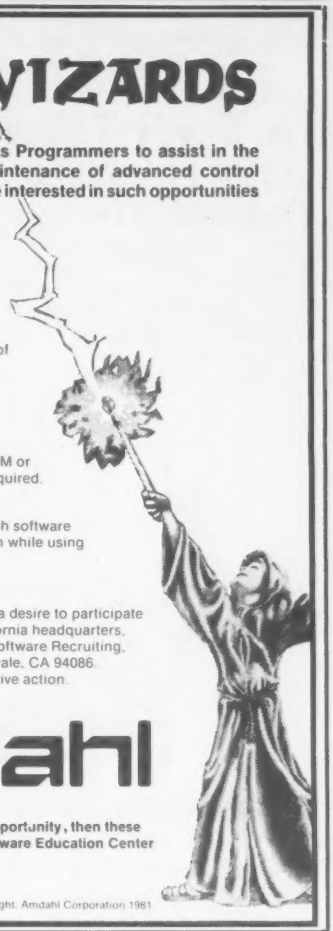

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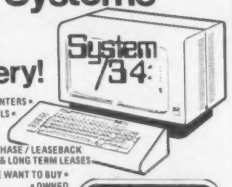

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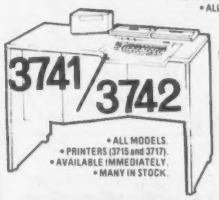

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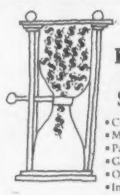

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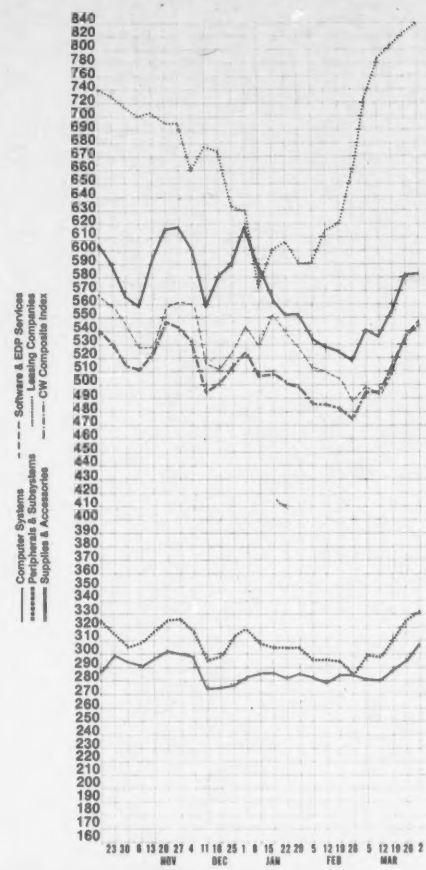
Computerworld Stock Trading Index



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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 1, 1981

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

E X C H		1980-81 RANGE (1)	CLOSE APR 1 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	15- 42	37 3/8	- 1/8	-0.3
N	BURROUGHS CORP	47- 88	53 1/4	- 1/4	-0.4
O	COMPUTER AUTOMATION	9- 27	15 3/4	0	0.0
N	CONTROL DATA CORP	35- 77	68 3/4	+3	+4.5
O	CRAY RESEARCH INC	10- 49	37 1/4	-2 3/4	-6.8
N	DATA GENERAL CORP	46- 87	55 5/8	+2 7/8	+5.4
N	DATAPOINT CORP	22- 82	58 1/4	-4	-6.8
N	DIGITAL EQUIPMENT	52- 98	93 5/8	+4	+4.4
A	EECO INC	6- 17	13	0	0.0
N	ELECTRONIC ASSOC.	6- 12	9 7/8	- 1/4	-3.0
N	FOUR-PHASE SYSTEMS	19- 49	33 1/8	+1 3/8	+4.3
N	FOXBORO	31- 60	57 1/2	+1 5/8	+2.9
O	GENERAL AUTOMATION	7- 19	12 1/4	+1 1/8	+10.1
O	GRI COMPUTER CORP	1- 3	1 1/2	0	0.0
N	HARRIS CORP	25- 56	55 3/4	+1 3/4	+3.2
N	HEWLETT-PACKARD CO	48- 95	82 1/2	+2 1/2	+2.7
N	HONEYWELL INC	85-115	104 1/2	+ 5/8	+0.6
N	IBM	50- 79	63	- 7/8	-1.3
O	MAGNUSON COMP SYSTS	20- 46	27 1/2	-3 1/2	-11.2
N	MANAGEMENT ASSIST	9- 25	14 3/8	- 5/8	-4.1
O	MINI-COMPUTER SYST	1- 6	1 5/8	0	0.0
N	MODULAR COMPUTER SYS	8- 31	12 7/8	-1 1/8	-8.0
N	NCR	52- 82	66 1/4	+3 1/4	+5.1
N	PRIME COMPUTER INC	10- 41	34 1/2	+ 1/2	+1.4
N	PERKIN-ELMER	13- 35	30 1/8	-1 1/8	-3.5
N	SPERRY CORP	42- 85	58 1/8	- 7/8	-1.4
O	TANDEM COMPUTERS INC	13- 78	75	-1 1/4	-1.6
N	TEXAS INSTRUMENTS	78-150	117	-2 1/4	-1.8
A	WANG LABS.	17- 60	37 1/2	+2 1/8	+6.0
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 27	23 1/2	+1	+4.4
N	COMDISCO INC	6- 24	22 1/4	+1 1/4	+5.8
A	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	1 1/2	0	0.0
O	CONTINENTAL INFO SYS	2- 15	7 1/2	- 1/2	-6.2
M	DATRONIC RENTAL	3- 5	4 3/8	- 1/8	-2.7
A	DCL INC	3- 6	3	+ 1/8	+4.3
N	DPF INC	5- 12	9 3/4	+ 3/4	+8.3
O	ITEL	1- 15	1 1/4	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 3/8	+ 3/8	+12.5
N	RELIANCE GROUP INC	24- 79	73	-2	-2.6
N	U.S. LEASING	12- 29	28 3/4	+1 1/8	+4.0

E X C H		1980-81 RANGE (1)	CLOSE APR 1 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	3 3/4	- 1/8	-3.2
O	ADVANCED SYSTEMS INC	12- 15	12 3/4	- 3/4	-5.5
O	ANACOMP INC	7- 24	20 7/8	+ 7/8	+4.3
O	ANALYSTS INTL CORP	3- 14	8 3/4	0	0.0
A	APPLIED DATA RES.	8- 24	20 5/8	+2 5/8	+14.5
N	AUTOMATIC DATA PROC	31- 57	56 3/4	+2 3/4	+5.0
O	CDA COMPUTER ASSOC	8- 17	12 1/2	+ 1/2	+4.1
O	COMPUTER HORIZONS	1- 5	2 1/4	0	0.0
O	COMPUTER NETWORK	4- 8	4 7/8	+ 1/4	+5.4
N	COMPUTER SCIENCES	11- 30	18 1/4	0	0.0
O	COMPUTER TASK GROUP	1- 23	18 1/4	- 1/2	-2.6
O	COMPUTER USAGE	2- 10	5 1/4	- 1/2	-8.6
O	COMSHARE	11- 21	13 3/4	+ 1/4	+1.8
O	CULLINANE DATABASE	18- 53	52 3/4	+4 1/2	+9.3
O	DATA DIMENSIONS INC	1- 6	2 1/8	+ 1/8	+6.2
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	5 5/8	- 1/4	-4.2
O	DYATRON CORP	4- 11	9 1/4	+2 3/4	+42.3
N	ELECTRONIC DATA SYST	18- 50	48 7/8	- 1/8	-0.2
O	INFORMATICS INC	9- 26	25 1/2	+ 1/8	+0.4
O	INSYTE CORP	1- 3	2 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 4	1 1/4	+ 1/4	+25.0
O	KEANE ASSOCIATES	3- 9	5	- 1/4	-4.7
O	KEYDATA CORP	1- 5	3/4	- 1/8	-14.2
A	LOGICON	12- 34	32 1/4	-1 1/4	-3.7
O	MATHEMATICA INC	5- 18	14 1/2	+ 1/4	+1.7
O	MATHEMATICAL APP GRP	7- 33	20 1/2	+1	+5.1
O	NATIONAL DATA CORP	5- 20	19 1/2	+ 1/4	+1.2
N	PLANNING RESEARCH	5- 13	7	- 1/8	-1.7
O	PROGRAMMING & SYS	1- 1	1	0	0.0
O	RAPIDATA INC	4- 11	6 1/2	- 1/8	-1.8
O	REYNOLDS & REYNOLD	19- 34	22 1/4	+ 1/4	+1.1
O	STSC INC	8- 28	19 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	3- 17	11 1/4	- 1/4	-2.1
N	TYMSHARE INC	17- 51	48 7/8	- 1/8	-0.2
A	URS CORP	5- 17	13 1/2	- 3/8	-2.7
N	WYLY CORP	4- 20	13 5/8	- 3/8	-2.6
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	11- 24	18 1/2	+ 1/8	+0.7
A	ANDERSON JACOBSON	8- 25	19 3/8	+ 3/4	+4.0
O	AUTO-TROL TECHNOLOGY	18- 82	33 1/2	+1 1/2	+4.6
O	BEEHIVE INT'L	2- 18	14 1/4	0	0.0
A	BOLT,BERANEK & NEW	12- 37	35 1/2	+ 1/8	+0.3
N	BUNKER RAMO	17- 52	47	-3	-6.0
O	CAMBRIDGE MEMORIES	1- 9	3	+ 3/8	+14.2
N	CENTRONICS DATA COMP	13- 55	14 7/8	-1 1/4	-7.7
A	CETEC CORP	3- 8	7 1/4	+ 1/4	+3.5
O	COMPUTER DEVICES INC	5- 10	8 3/4	- 1/4	-2.7
O	COGNITRONICS	1- 10	9 5/8	+ 7/8	+10.0
O	COMPUTER COMMUN.	2- 10	3	+ 3/8	+13.9
O	COMPUTER CONSOLES	4- 29	24	+ 1/2	+2.1
O	COMPUTER TRANSCEIVER	1- 6	4	0	0.0
N	COMPUTERVISION CORP	24- 92	80 5/8	-1 5/8	-1.9
N	CONRAC CORP	13- 25	20 7/8	+1 1/4	+6.3

E X C H		1980-81 RANGE (1)	CLOSE APR 1 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 23	15 7/8	-1 3/8	-7.9
A	DATAPRODUCTS CORP	11- 41	41 3/8	+2 7/8	+7.4
O	DATUM INC	2- 5	2 3/4	0	0.0
O	DECISION DATA COMPUT	2- 6	3 7/8	- 1/4	-6.0
O	DELTA DATA SYSTEMS	1- 3	2 1/4	0	0.0
O	DATARAM CORP	6- 37	9 7/8	+ 1/2	+5.3
N	ELECTRONIC M & M	3- 9	6	+ 3/8	+6.6
O	EVANS & SUTHERLAND	21- 83	79	+11	+16.1
O	FABRI-TEK	1- 4	3 1/8	0	0.0
O	GENERAL COMPUTER SYS	1- 12	9 3/4	-1	-9.3
O	GEN'L DATA COMM IND	8- 22	17	+2 1/8	+14.2
O	GENERAL TERMINAL CP	1- 4	1 3/8	-	-4.1
N	HAZELTINE CORP	12- 33	23 1/8	+1 1/8	+5.1
O	INFORMATION INTL INC	8- 15	12 1/4	- 1/2	-3.9
O	INTEL CORP	23- 50	36 1/2	- 1/2	-1.3
A	LUNDY ELECTRONICS	4- 17	10 5/8	- 1/4	-2.2
O	MSI DATA CORP	5- 19	18 1/8	0	0.0
N	MEMOREX	10- 34	12 3/4	+1	+8.5
N	MOHAWK DATA SCI	10- 31	23 1/4	- 7/8	-3.6
O	NETWORK SYSTEMS CORP	14- 25	19 5/8	+ 5/8	+3.2
O	OMEX	2- 12	9	0	0.0
A	PARADYNE CORP	9- 39	38 5/8	+ 1/2	+1.3
A	PENRIL CORP	9- 16	14 1/2	- 1/8	-0.8
O	RAMTEK CORP	10- 23	19 1/2	+2 1/4	+13.0
O	RECOGNITION EQUIP	5- 21	16 3/4	+ 7/8	+5.5
O	SCAN DATA	1- 3	2 1/2	- 1/4	-11.1
N	STORAGE TECHNOLOGY	12- 27	26 1/4	-1	-3.6
O	SYKES DATATRONICS	14- 50	45 1/2	+1 1/2	+3.4
O	T BAR INC	14- 24	17 3/4	- 3/8	-2.0
A	TEC INC	3- 9	4 7/8	+1	+25.8
N	TEKTRONIX INC	42- 70	53 3/4	-1 1/8	-2.0
N	TELEX	3- 8	8	- 1/8	-1.5
O	TESDATA SYSTEMS CP	8- 26	10 1/4	+ 3/8	+3.7
A	TIMEPLEX INC	5- 22	13 1/2	- 1/2	-3.5
O	WILTEK INC	1- 3	2 3/4	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 18	18	+ 1/4	+1.5
O	BALTIMORE BUS FORMS	1- 2	3/4	+ 1/4	+50.0
N	BARRY WRIGHT	8- 22	19 7/8	+ 1/8	+0.6
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	14	+ 3/4	+5.6
N	ENNIS BUS. FORMS	13- 81	17 1/2	+ 3/8	+2.1
N	3M COMPANY	46- 85	83 1/8	-1 1/2	-2.3
O	MOORE CORP LTD	27- 38	38	- 3/8	-0.9
N	NASHUA CORP	20- 35	23 1/8	-3 3/8	-12.7
O	STANDARD REGISTER	22- 35	34	+ 1/4	+0.7
A	TAB PRODUCTS CO	9- 30	18 7/8	+ 7/8	+4.8
N	WALLACE BUS FORMS	12- 26	23 7/8	0	0.0

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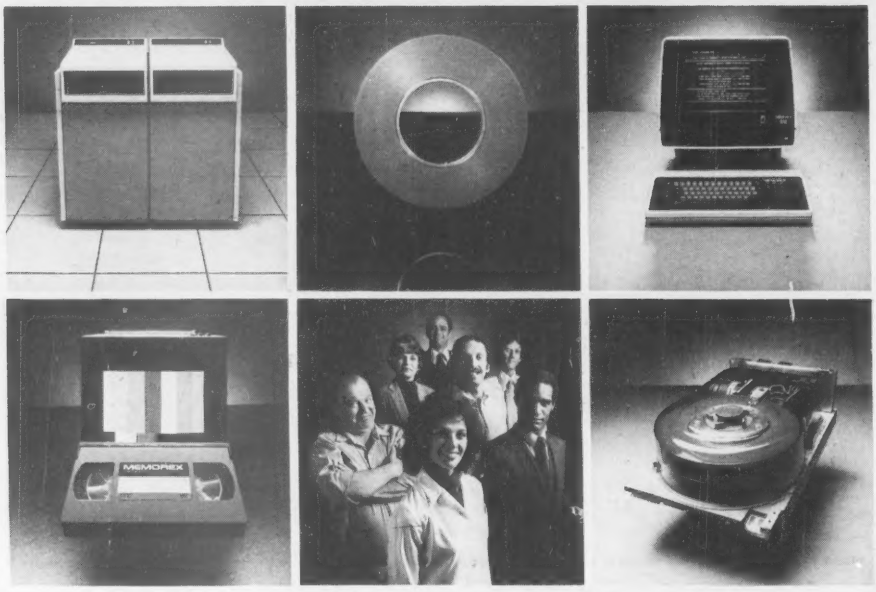

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